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10 OCTOBER 1986

# Europe Report

## SCIENCE AND TECHNOLOGY



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# EUROPE REPORT

## SCIENCE AND TECHNOLOGY

### WEST EUROPE

SCIENTIFIC AND INDUSTRIAL POLICY



### EAST EUROPE

BIOTECHNOLOGY



COMPUTER

MICROELECTRONICS



SCIENTIFIC AND INDUSTRIAL POLICY



/9986

WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY ITALY

# OLIVETTI: CORPORATE ACTIVITIES, RESULTS FOR 1985

Ivrea NOTIZIE OLIVETTI in Italian Jun 86 pp 2-7

[Article: "Olivetti 1985: More Sales, More Profits, More investments, New Jobs"]

[Text] Carolo De Benedetti calls the following report "a new dimension that is not an end but a solid starting point. The agreement with Volkswagen and the acquisition of Triumph-Adler confirm Olivetti as "the leader in Europe and the sector's pole of concentration for European technological know-how and marketing ability."

In 1985, the Olivetti Group had 6.1405 trillion lire in general sales, which was an increase of 34.1 percent over the previous year and 503.7 billion lire in net profits for an increase of 41.5 percent. Some 466 billion lire were invested in technical and commercial buildings and 284 billion in research. The group's growth was accompanied by a net reduction in indebtedness from 319.3 billion lire at the end of 1984 to 190 billion at the end of 1985. The consolidated net worth grew from 1.958 trillion lire in 1984 to 2.280 trillion in 1985 for an increase of 16.4 percent. Some 1,800 people were hired in Italy in 1985, and the number of employees in the group increased from 47,613 to 48,944.

The group's flagship company, C. Olivetti & Co. S.p.A., amassed a net profit of 329.5 billion lire for an increase of 39 percent over 1984 and issued a dividend of 320 lire per share of common and preferred stock and 340 lire per share of bonds.

The Olivetti Group realized a growth in general sales of 1.5 trillion lire in the course of the year, which equals the entire sales of the main company 3 years ago and constitutes a new dimension for Olivetti. Its growth has been consolidated in the last 5 years (sales up 2.8 times) with a strong increase in profits (up 5.7 times) in a context of increasing net worth and financial structural strength.

The policy of growth that we have chosen and diligently and determinedly pursued has yielded results that might have seemed impossible or fantastic only 8 years ago. We intend to continue with the determination and flexibility required in the market in which we are operating so that we may meet the risks and opportunities, which are both quite high.

Computer technology is one of the factors most directly affecting structural changes in the world economic system, but nothing can be taken for granted in this field. The new levels we have reached are thus not an end in themselves but a solid starting point. In a world characterized by innovation and internationalization, human resources are increasingly becoming a strategic element in business success. Olivetti has invested in retraining its own human resources in terms of both large-scale training and making new efforts to enable personnel to deal with change and guide its development. On these human resources is based our confidence in meeting the great problems raised by our very success, to keep the Olivetti Group in a position of leadership in its sector and, perforce, in the world.

The group's growth in 1985 is also reflected in production, which increased about 40 percent. This presupposes the commercial success of its products. Foremost among these are professional personal computers, of which Olivetti is the second largest manufacturer in the world. This fact increases our determination to increase the group's capacity and ability in systems integration, which will contribute significantly to our strategic success.

In 1985, the validity of the alliance with AT&T was born out, for it enabled Olivetti to export 156,000 personal computers to the United States at a value of 512 billion lire. Collaboration with AT&T was also launched on matters of common interest to strengthen our role in the field of "information technology." The recent acquisition of the Bunker Ramo bank automation division fits our policy of playing a significant role in another large growth area, namely bank automation. We plan to do this on a world-wide scale and, therefore, also in the United States.

Our policy of strengthening Olivetti in Europe was maintained in 1985 by the acquisition of the British Acorn company, which specializes in computers for education. In the early months of 1986, a strategic agreement was concluded with the Volkswagen Group whereby Volkswagen became an Olivetti shareholder and Olivetti acquired Triumph-Adler from Volkswagen. This agreement, and Volkswagen's desire to remain involved in this sector not directly but by association with us, confirm Olivetti as the leader in Europe and the sector's pole of concentration for European technological know-how and marketing ability. In December 1985, a significant agreement was reached with the French stockholders represented by CIT-Alcatel [Industrial Telephone Co.] and a group of banks for CIT's gradual repurchase of the shares held by them. This agreement is linked to industrial collaboration between Olivetti and CIT-Alcatel. Also in France, an industrial collaboration agreement was reached with the Bull group for the joint planning and production of automatic banking systems.

The Teknecomp Group was formed in 1985. It will be headed up by the Olivetti companies making electronic components. The name Teknecomp was listed on the stock exchange in March 1986 and has had great success. It is a significant event for the group and represents the achievement of an objective and the results of a strategy that will be followed in the future. The return of savings to risk capital after years of absence has extremely important structural implications. It is a widespread phenomenon due to the strong economic recovery following the collapse of the oil cartel. In the long run this means that economic systems and healthy companies have a great opportunity and increased chances of success to solve development problems so that they will benefit everyone and therefore be socially constructive. Olivetti intends to do its part in this process, which is of historic importance.

The Areas of Research

In 1985, the group continued its research and development efforts for the purpose of exploring and developing innovative technologies. In the context of the strategies that have been defined, these technologies make it possible to update product lines continually in a swiftly-changing environment. This activity has been carried out in research and planning centers located in Italy and abroad (California, Switzerland, England, France, Spain and Singapore). In 1985 it involved expenditures of 284 billion lire for a 24.3 percent increase over 1984. The personnel employed rose to 3,502 for an increase of 279 units since 31 December 1984. The proportion of research and development personnel to the total is presently 7.2 percent within the group and 10.8 percent in Italy.

Among the activities that have taken place in the fiscal year, research into printing devices has continued to be of great importance. One important area of research is that oriented to the study of various heat-transfer technologies. Significant progress has been made in ink-jet printing. These new technologies have especially interesting functional characteristics, such as quietness, variable fonts and graphic capabilities. Of particular interest is Olivetti Laboratories' research into new large-memory technologies, especially optical readers.

Another area of research in which Olivetti is heavily involved is voice processing and speech analysis. Advanced studies are under way on voice synthesizing, particularly techniques that enable machines to read aloud paragraphs or variable texts of indefinite length (text-to speech) in the main western languages. Olivetti Laboratories is also doing research in voice recognition, where the machine can understand human speech and increase its vocabulary. In the image-processing sector, significant developments have been achieved in both digital color-reading technology and aspects of system integration in an experimental "office file" context for processing alphanumeric documents and black-and-white and color images. As for the voice- and image-processing sector, it should be remembered that Olivetti Laboratories are participating in research connected with the Esprit program for image and voice processing. In 1985, the product line continued to be renewed and modernized for the purpose of consolidating and strengthening supply in the market and applied sectors in which Olivetti's presence is already significant.

In the context of the Esprit project, Olivetti's active participation in the Inca project should be emphasized. This project involves research in the sector of local and wide-band networks. Olivetti is also engaged in the Graspin project, a graphics "workstation" for advanced program preparation. Also in the "network" area of the CNR [National Research Council], the Osiride project has been concluded in collaboration with the Finsiel group. This project makes possible the compatibility of disparate systems. It is also opportune to emphasize the beginning of research in the emerging sector of artificial intelligence, with projects designed for "expert systems" by "decision support" and "fault detection," the latter being intended for use in engineering fields.

International Collaboration

The validity of the development strategy undertaken by the Olivetti Group in 1984 has been confirmed by results achieved in 1985. These results have put Olivetti first among European countries and second in the world in the production of compatible professional personal computers. In 1985, the area of the personal computer was the object of special attention. Both direct and indirect distribution structures were strengthened, and our involvement is represented not only by the introduction of new models but extends into the area of peripherals and software, making Olivetti a company with a most extensive range of products.

The investment of March 1985 in the Acorn Computer Group PLC of Cambridge, Great Britain (a company in which Olivetti presently has a 79.8 percent holding) is to be seen as part of Olivetti's strategy in the sector of personal computers. Acorn's technological capacity and Olivetti and Acorn's joint strategy in the field of education have led to an agreement with the French company Thomson, an agreement that is intended to set a new European standard in the field of education. It is a cause of satisfaction that the Olivetti-Thomson-Acorn project is one of the ten projects approved by the European initiative Eureka. MicroAge Europe has also been set up for the purpose of improving operations in the field of personal computers; its objective is to become a leader in European personal-computer sales. In 1985, Olivetti pursued its development with the intention of making its products and services "world-class competitors" in the information technology sector. Particularly important has been the initiative in the value-added service sector. Seva S.p.A has been formed as a company promoted and managed by Olivetti. The Olivetti Group holds a 42 percent share in it along with participation by SIP [Italian Telephone Company], ENI [National Hydrocarbons Agency], American Express, Diner's Club and Visa. The formation of Seva presupposes that Olivetti will have a significant presence in the field of value-added services in Italy.

In the course of the year, Olivetti acquired total control of Docutel/ Olivetti Corp, (which assumed the title of Olivetti USA in February 1986) for the purpose of acquiring greater flexibility and operating efficiency on the American market. The presence of the group in the United States will also be strengthened by the acquisition of ADP (Automatic Data Processing, Inc.) of New York from the Bunker Ramo automatic banking division, which designs, produces and sells bank terminals.

Two significant joint-venture agreements have been made. The first concerns a joint venture with the French company Bull in the field of ATM's (automatic teller machines). This agreement provides for the formation of the SIAB company, of which Olivetti holds 51 percent. Its headquarters will be in France, and its purpose is to furnish an advanced line of bank automation products for the Olivetti and Bull sales networks. The second agreement, with the French company CIT-Alcatel, provides for a joint venture in which Olivetti plays a major part. This venture will also be based in France, which will operate in the sector of office automation. The Olivetti Group's determination to strengthen its position as European leader in the sector of information processing technology is confirmed by the closing of an agreement to acquire Triumph-Adler, a German company that has a broad line of office automation products and is directly involved in markets in Europe, North America, Australia, and New Zealand. This is a particularly important development especially because it means that Volkswagen will become an Olivetti stockholder company.

Olivetti has continued its policy of venture capital with direct investments in the software sector and telecommunications networks. Another significant investment is participation in the ES-2 initiative, which is the first example of a multinational European company for designing and producing custom-made small-series VLSI [very large systems integration]. In 1985 and the early months of 1986, Olivetti continued its investment activity in venture-capital funds with participation in and raising capital for Olivetti partners NV, which operates in the U.S. market. Olivetti has also formed and financed numerous funds (Finnova S.p.A in Italy, Euroventures in Holland, Apa in France, IVCP in Luxemburg, BDC-3 and H&Q Ventures in the United States, and Japan Venture Fund in Japan).

The relationship with AT&T is proving to be mutually satisfactory. Olivetti is making a special effort to increase the 3B minicomputers' market penetration and is ready to introduce the new AT&T telecom products on the market. AT&T is continuing successful sales of Olivetti personal computers in the United States, where they have now gained a significant share of the market. AT&T and Olivetti have set the integration modes of their product offerings with the products that the two companies will be introducing in 1986. The respective research and development groups are working on future product plans that will be as coordinated as possible considering the various positions they have achieved, market diversity and, especially for Olivetti, the necessity of strengthening its product line in the short run with solutions that represent continuity with the past.

The proposed alliance with Toshiba complements rather than competes with the AT&T alliance and is thus intended to strengthen Olivetti's position.

The Olivetti Group's 5-Year Trend
(in billions of lire)

| category | 1981 | 1982 | 1983 | 1984 | 1985 |
|---|---|---|---|---|---|
| Net income | 2,887.9 | 3,341.4 | 3,736.2 | 4,578.0 | 6,140.5 |
| Net profits | | | | | |
| incl.research expend. | 95.6 | 102.8 | 295.3 | 356.0 | 503.7 |
| excl.research expend. | 95.6 | 82.8 | 187.4 | 324.8 | 427.2 |
| Distributed profits | 48.4 | 65.6 | 84.2 | 137.6 | 160.1 |
| Dividends distributed | 47.9 | 65.1 | 83.5 | 126.0 | 158.4 |
| Net assets | 582.4 | 954.8 | 1,202.1 | 1,958.3 | 2,279.7 |
| Net indebtedness | 844.4 | 862.9 | 726.0 | 319.3 | 190.0 |
| Number of employees (as of 31 December) | 53,471 | 49,763 | 47,800 | 47,613 | 48,944 |
| | | (1981=100) | | | |
| Net income | 100 | 115.7 | 129.4 | 158.5 | 212.6 |
| Net profits | | | | | |
| including research | 100 | 107.5 | 308.9 | 372.4 | 526.9 |
| excluding research | 100 | 86.6 | 196.0 | 339.7 | 446.9 |
| Net assets | 100 | 163.9 | 206.4 | 336.2 | 391.4 |
| Net indebtedness | 100 | 102.2 | 86.0 | 37.8 | 22.5 |

Olivetti Group Combined Data
(in billions of lire)

| category | 1985 | 1984 | pct. change |
|---|---|---|---|
| Net profits before research exp. | 427.2 | 324.8 | +31.5 |
| research contrib. (excl. 3rd parties) | 76.5 | 31.2 | -- |
| Net profits | 503.7 | 356.0 | +41.5 |
| Amortizations | 271.5 | 250.5 | +8.4 |
| Cash flow | 775.2 | 606.5 | +27.8 |
| General management funds | 873.4 | 704.0 | +24.1 |
| Net income | 6,140.5 | 4,578.0 | +34.1 |
| Research & development exp. | 284.0 | 228.5 | +24.3 |
| Fiscal year investments | 465.9 | 413.9 | +12.6 |
| Net assets | 2,279.7 | 1,958.3 | +16.4 |
| Net indebtedness | 190.0 | 319.3 | -40.5 |

Flagship Company Combined Data
(in billions of lire)

| category | 1985 | 1984 | pct. change |
|---|---|---|---|
| Net profits | 329.5 | 237.1 | +39.0 |
| Amortizations | 166.6 | 140.7 | +18.4 |
| Cash Flow | 496.1 | 377.8 | +31.3 |
| General management funds | 565.4 | 438.6 | +28.9 |
| Net income | 3,487.4 | 2,552.5 | +36.6 |
| Research & developm't expend. | 199.1 | 156.8 | +27.0 |
| Fiscal year investments | 197.3 | 203.3 | -3.0 |
| Net assets | 2,181.7 | 1,879.0 | +16.1 |
| Net current indebtedness | 166.2 | 100.8 | +64.9 |

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CSO: 3698/661

WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

# REPORT ON ITALTEL'S RESEARCH LABORATORIES

## Where Telematics Begins

Milan NOTIZIE ITALTEL in Italian Jun 86 p 4

/Article by Nando Santonastaso/

/Text/ It is a practically perfect marriage. One of those, in short, that should calmly overcome even the possible crisis in its seventh year. Research and Italtel Telematica are the terms of a binomial that really seems destined to long endure. But what does research mean to a concern like the one at Santa Maria? When we asked the vice president Alberto Nicoletti Altimari he said, "Italtel was included in the framework of the economic and industrial development of the South in 1960 when this establishment was founded, and our productive activity began 2 years later. In 1982 when the establishment was assigned to the Italtel Telematica Company the first nucleus of the research and development laboratory was formed. Since then this organization has been growing and qualifying itself more and more to the point of obtaining absolutely brilliant results."

SANTONASTASO: Italtel Telematica concluded its fiscal year 1985 with a further gain in its net profits. Should the credit for that result also be attributed to research and development?

ALTIMARI: Certainly. In 1985 the company accelerated its innovation programs in two directions, namely technological development of the products and productive processes, and renovation and expansion of the list of products. Italtel Telematica has demonstrated factually that the steadily growing investments made in the research sector in recent years are producing results. Our presence on the traditional markets has been enhanced and the initiatives to diversify into the new sectors of office automation have been followed up, while showing a considerable increase in sales of consumer systems and equipment, which represent the company's main activity. All this would certainly have been impossible without the support of the research and development laboratory."

SANTONASTASO: What do you think is the effect of so many young researchers on the staff of this establishment?

ALTIMARI: Positively sensational. I must acknowledge that they are qualified people with a great will to work and to enable the firm to make the best and most advantageous choices on the productive and commercial levels. It is no accident that over half of Italtel Telematica's researchers are working in the laboratory at Santa Maria Capua Vetere. That is a significant acknowledgement bearing out both the firm's willingness to count heavily on the intellectual forces of this area and the company's ability to keep up with the demands of an increasingly difficult and contested market. I want to call attention to our Milan laboratories' vital contribution both to the attainment of the firm's aims to renovate products and increase sales and to the Santa Maria laboratory's own growth. It is thanks to these two units, geographically separated but closely integrated in their purposes and working methods, that Italtel Telematica can take up the challenge of competitiveness on the highest levels today.

For Pasquale Esposito too, chief of personnel in the Caserta shop, the enhancement of the research laboratories was "An important point in the firm's development." He added, "In the last 3 years about 20 new products have been placed in production, including the higher-capacity private numerical exchanges. The technological shift to electronics has involved major vocational training programs. Last year for example this establishment spent 230,000 hours on courses training over 2,000 people."

SANTONASTASO: What percentage of your employees are in the telematics sector?

ESPOSITO: At the end of 1985 over two-thirds of this establishment's personnel were in that sector. The shift is still going on, although with various problems. There is still the matter of the surpluses to be settled. In spite of the introduction of the solidarity contracts, that problem has not been completely solved. One of the positive notes about the firm's effort is the steady and certain growth of the research and development laboratory. Today we could well say that it is the best guarantee of Italtel Telematica's future.

Men and Technologies

Milan NOTIZIE ITALTEL in Italian Jun 86 pp 4-5

/Article by Nando Santonastaso/

/Text/ Claudio Rossetti, Italtel Telematica's research and development director, has a theory that sums up perhaps better than any other why this young but already efficient organization is within the Italtel group: "Whoever said that it is impossible to invest in research in the South was badly mistaken. Italtel Telematica is the most striking proof to the contrary. In fact I would point out that that the southerners are definitely suited to this kind of activity because they are gifted with a certainly uncommon creativeness, and the results of these 3 years clearly bear it out.

Yes, three busy and productive years of important achievements. Rossetti, who with Roberto Pipitone and Pier Carlo Ravasio has the task of guaranteeing the perfect functioning of the laboratory as regards design and operations, says "During these years we have enhanced the research and development nucleus, which now has over 120 specialists almost entirely recruited locally, by almost

reproducing the growth rates characteristic of electronic technologies on the organizational and industrial structures. We could say today that the initial venture has become an ebullient reality of people, technologies and prospects." Progress and competitiveness are the guidelines of the laboratory's activity, in its products, its technologies and its developmental resources. Ravasio says, "The main production lines addressed by the Santa Maria laboratories are the telephone terminals, intercommunicators and low- and medium-capacity private switchboards. All those products are then progressively affected technologically and in application by the convergence of telecommunications and data processing that vitalizes telematics and lends the research and development staff new methodologies and tools for design." And as soon as Italtel realized that it cannot fall behind in this strategically important field, the "great occasion" came. A fourth generation switchboard is now being developed at Santa Maria that can handle the whole communications traffic of an office (voice and data) and even provide "added value services" from the centralized filing to the electronic mail to the access to computer networks. Ravasio explained, "In developing these switchboards we combined both Italtel's consolidated and traditional technological experience in telecommunications and the concepts and methods of development so far characteristic of the information world. Both for this project and for the Santa Maria laboratory as a whole a completely advanced "software factory" was set up with a computing potential of more than 3 million instructions per second and a storing capacity of more than 3 billion characters (equivalent to 1.5 million typewritten pages) for the development of the programs and the whole documentation of the project." Italtel Telematica's laboratory is also completing the instrumentation, with attached automation, of the electronic and mechanical hardware project and a network of more than 100 terminals that will provide practically every designer with direct access to the "software factory" and to this new equipment -- in other words the best that is to be had today in this particular branch of technological research. It should also be said that such technical-financial efforts (The regular outlays on research and development, clear of the amortizations, were increased from about 9 billion in 1983 to 18 billion in 1985) have enabled Italtel Telematica's laboratory to win praises even overseas.

To pursue this subject further, we asked a few questions of Ugo Gagliardi, an expert with an international reputation (He is a Harvard professor and a member of the U.S. Academy of Sciences) who has been living and working in the United States for about 30 years and is acting as a consultant on Italtel's project for new-generation switchboards.

SANTONASTASO: Prof Gagliardi, can you give us an idea of the problems taken up and the kind of collaboration that exists between your society and Italtel Telematica?

GAGLIARDI: I follow the progress of the project for the new switchboards regularly, and I have concentrated mainly on the architecture of the siftware and hardware. Architecture is the highest level of design, and it determines the structure of the hardware and software components of the product, its performances, and the ease with which its functions can be implemented. That last point is especially important for marketing. In fact a good architecture can produce a product that can be readily adapted to the consumer requirements.

SANTONASTASO: How do you regard entrusting an exacting project like this one to a design group and a laboratory composed of many youths like those at Santa Maria?

GAGLIARDI: The rate of technological innovation is so high in our industry that experience soon becomes obsolete. Under those circumstances a young staff is an advantage and no disadvantage. In fact, young men are not prejudiced as to why a product cannot be made. What could not be done only 5 years ago is feasible today because in 5 years the industry has improved its cost-performance ratio by more than one order of magnitude.

SANTONASTASO: You have participated in the growth of the group and in the development of the system. Can you sum up the resulting experience?

GAGLIARDI: A very brief reply is that a little Silicon Valley has been created in Santa Maria. A longer reply is that a really exceptional group has been formed and the results of the project have contributed to the rapid growth of the staff. The progress in developing the system has been spectacular.

SANTONASTASO: What is your preception of the potentials and capacities created at Santa Maria? Can you compare it with other international experiences you have shared?

GAGLIARDI: This project is in the lead for voice and data integrated PBX's (switchboards). I know of only one other project that comes close to the potentials of this one, but that other project is sadly lacking in integration of the PBX functions with the applications of office automation. I sincerely believe that Italtel has excellent prospects of gaining a major role on the world markets with this product.

## Breakthrough at Santa Maria

Milan NOTIZIE ITALTEL in Italian Jun 86 p 5

/Article by Nando Santonastaso/

/Text/ In April 1982, when the research and development laboratory at Santa Maria Capua Vetere was founded, it had only 25 employees. By the end of 1986 it will have no less than 140, or 30 more than last year. In other words, the family is growing steadily. It is based on a strategically important company philosophy of entrusting the new bet on the Italtel group's future to the quality of the research and development and accordingly that of the innovation. This bet will play a significant part in the South because of the element of novelty and influence. The breakthrough (But it is much more than that) made by Italtel in the always broad front of skepticism and suspicion typical of the southern area is broadening hitherto unknown horizons.

But how are these young researchers of the Santa Maria laboratory "living" this experience in many exciting directions? What are their ambitions, fears and motivations? In order to discover that we met with four of them during a break in the normal work morning. There were four chats in absolute freedom with no restrictions of any kind. Questions and answers turned the interview into a dialogue of several voices. The results were undoubtedly most interesting. Salvatore La Gatta, aged 30, from Pomigliano d'Arco said, "Many of us from the same

alma mater, the University of Naples, have met again here in Italtel Telematica's research center. That has pleased all of us and helped us to better adjust to an environment of such exceptional work. I, as I believe almost all my colleagues, made the request to be hired.

"I was interviewed and considered ideal for this activity, and here I am. I have been here for 3 years now. When I arrived the laboratory was just a little outfit. And the very fact of being able to help enhance it, in other words to be a protagonist in an activity that was growing was a marvellous feeling. It enabled me to throw myself into it with still greater will power."

Their meeting with Italtel Telematica was all the more significant because they were youths and almost all in search of their first jobs. As Antonio Mercuri, aged 27, from Benevento confirmed, "The university tended to regard the research center as a privileged opening from the standpoint of employment. At Santa Maria we found not only the opening we were looking for once our studies were completed but also the ideal environment to get into. We are all young men with a great desire to show that the firm did well to count on our abilities."

All four of them work on the switchboard production line, but as distinguished from the others Franco Uomo, aged 30, a Neapolitan who lived for some time in Caserta, is the only one who got his first experience in Milan. "I knew," he told us, "that there was a gradual but steady conversion to electronics at Santa Maria and that is why I asked to be hired. I was assigned to the Milan laboratory for the "5,000 Offices" project. I stayed there for a year and a half acquiring a lot of experience. When I came to the Santa Maria laboratory I actually entered a new professional dimension. In Milan I was working on a product in the final stages, while here I am working on a project in full development. There is a great difference."

And the ladies? There are not many, only ten of them, but it is a professional presence quite "on a par" with that of the male researchers. As Adriana Correale, aged 26, with a degree in Information Science and a resident of Roccapiemonte in Salerno province confirmed, "We are all on the same level and we all respect ourselves in the same way. No, we girls are not regarded as 'rare birds' in here. That would be the last straw. We know very well that team work is most important in order to obtain sure results."

In other words they do not feel at all like so many Archimedes the Pythagorean, and on the other hand it would make no sense to try to stand out. As Franco Uomo also said, "We have all been placed perfectly at our ease in this laboratory. To be sure we too felt the fear of the neophyte when we started to work in this outfit, but I must acknowledge that Italtel has allowed us all the time needed to adjust and fulfill our potentials." Salvatore La Gatta added, "On the other hand an experience like this under the circumstances in the South is definitely rare. There is a research tradition in the North that facilitates the admission of young graduates. Fortunately even the South seems to be on the right path. Situations like this must encourage a more extensive presence of research centers in the area."

They could talk at length about their studies, the projects advanced in these years, and the brilliant results achieved and to be achieved. But the reporter has a relative interest in the matter. These youths of the South are really much more than bright researchers, which already means a great deal. They may be primarily a sign of hope for the South and a surety of the development that many still deny.



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WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

# ITALTEL'S BELLISARIO ON CORPORATE STRATEGIES

Milan NOTIZIE ITALTEL in Italian Jun 86 p 3

/Article by Marisa Bellisario: "Italtel's Course of Accomplishment"/

/Text/ The year 1985 marked an important stage in the organizational and technological transformation of Italtel, and it is now entering the final phases of the process. Some 70 percent of the output is electronic, the main products making it competitive in Italy and abroad have been introduced, and a major international presence has been established. Although everyone's efforts and contribution will be required in the next few years in order to complete the technological conversion, much headway has already been made on the path of innovation. Italtel is radically different today from the firm that it was in 1980-1981, not only because it is producung wealth instead of losses but especially because its products, its way of producing them and its professional and managerial capacities for doing so have changed.

The profits for 1985, which consolidated the good results obtained in the two preceding years, and the increased sales in the new productive sectors proved the validity of the strategic options that had been adopted. In 1985 sales of telematic systems and office automation equipment increased by 26 percent and sales of digital switchboards of the UT Line by nearly five times from 1984. Those "peaks" were reached in spite of the fall in prices of electronic products because that and the reduced sales of electric products helped to keep the consolidated sales largely stable since 1984, and the stagnation of Italian investments in public telecommunications affected consolidated sales. The current 10-Year Telecommunications Plan gives the firms a frame of reference, but not enough resources are invested to provide Italy soon enough with a telecommunications infrastructure capable of powering the country's economic and social growth. Italtel is counting on an updating of the plan to include among other things the heavier investments specified by the Ministry of Industry's "Incentive" Plan and to determine the ways of financing them.

## Investments and Innovation

The increased investments in telecommunications and the resulting growth of the public manufacturing industry's sales will make it possible to go on allocating considerable resources to technological innovation and the planned new products.

In 1985 Italtel spent about 134 billion lire on research and development, or 11 percent of its consolidated sales, which is the kind of outlay generally considered necessary to develop technologies that can make the future products competitive.

Italtel's organizational, economic and financial consolidation is also necessary in order to single out new areas and sectors in which to invest the firm's resources and enhance development. Diversification of products and markets accordingly acquires, as of today, a special strategic priority for the future.

Progress important to the region and the office has been made in telematics as, for example, the "optical island" at the Milan Trade Fair and the telematic information service for Milan Commune. An appropriate corporate structure was formed recently to encourage new and diversified initiatives within Italtel and to coordinate their implementation. The diversification strategy, started in 1985, includes the activities of the Telesis Consortium operating specifically in the telematics sector for the region. Activities in the electronics sector are also being developed and consolidated, in expectation of forming a new company for design and production of electronic components for the foreign market as well as the domestic market of Italtel.

Diversification and Employment

Diversification will also help to solve the employment problems caused by the increasingly rapid technological change, which is indispensable to the development and very survival of the firm but costly in terms of employment. In fact the technological and organizational change has reduced personnel from about 29,000 at the end of 1980 to about 19,000 at the end of 1985. Subsequent personnel surpluses will be handled in 1986 by appealing to the Wage Supplement Fund and the Solidarity Contracts. But reduction in personnel, which will continue in 1986 and the following years, will be handled by the innocuous means that have been used so far (early retirement, attrition and incentives to retire). As a matter of fact, the Italtel plan for 1986-1990 calls for a staff of about 15,000 at the end of the period.

Italtel Group: Figures from the Consolidated Balance Sheet

| | 1985 | 1984 | 1983 |
|---|---|---|---|
| Total sales (billions) | 1,227.9 | 1,199.2 | 1,097.6 |
| Per capita sales (millions) | 68.6 | 59.1 | 49.3 |
| Net overhead (billions) | 111.6 | 139.6 | 148.7 |
| Result of fiscal year (billions) | 42.1 | 25.2 | 10.0 |
| Internal resources (billions) | 474.8 | 440.0 | 308.1 |
| Net financial debits (billions) | 508.3 | 570.4 | 598.6 |
| Research, development costs (billions) | 133.6 | 106.5 | 100.6 |
| Staff as of 31 December (persons) | 18,840 | 20,254 | 21,702 |

The employment problem is especially acute for some industrial installations in the South, where 56 percent of the employees are concentrated. A number of proposals have been made to deal with it, some of them for implementation in the

course of the 3-year program to develop the South that was recently approved by parliament. They include complete industrial initiatives and accordingly some new research and development laboratories to be founded in the South that will be attached to the organizations already operating in L'Aquila, Palermo, Santa Maria Capua Vetere and Milan. For this purpose and to enrich Italtel's managerial and technical resources we plan to intensify the program for hiring young graduates and to add 1,00-1,200 youths to the firm in 1986-1990 for the laboratories in the South. The expansion of the industrial and research organizations in the South is accompanied by consolidation of the technical and manpower resources of the Milan laboratoties, which are a valuable and indispensable possession of Italtel and the nation.

Competitiveness and Collaboration

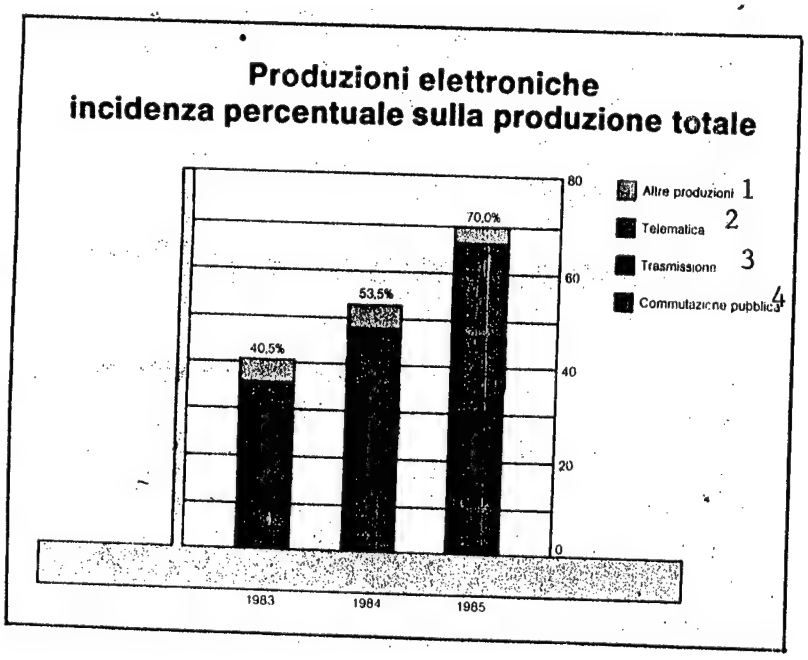
Research and development, destined to become the activity for greater added value in firms with advanced technology, is also the measure of our international competitiveness. Collaboration with other firms in this sector is important not only for consolidating the technological results but also for expanding markets and meeting competition effectively. As we know, the public telecommunications policy that Italtel has chosen, in addition to the already consolidated "national center" with GTE and Telettra, is one of cooperation with the major European firms. The first favorable results of the alliance with Alcatel, Plessey and Siemens have been confirmed by extension of the agreement to new forms of cooperation.

And finally it must be remembered that a firm's competitiveness abroad and its contractual power in the field of international alliances heavily depend upon the share of the national market that it controls. From that standpoint, in public telecommunications Italtel cannot count today upon a share of the national market comparable to those of its European partners. But our presence on the national telematics market has improved, which is an important development because there is a largely free market in that sector on which the choice is with the final customer, and it is on that market that Italtel has obtained the best results in terms of development of shares of the market.

In the medium to long term, exports will be in an increasing proportion of Italtel's sales, even if they may be only in the long term, either because of the precarious financial situation of many potential customers that are largely developing countries, or because of the long technical intervals (5-7 years) between the stage of selection and the start of supply. The recent agreements for transfer of technologies to China and Yugoslavia confirm the good prospects opening up for the firm abroad even in public telephone service, wherein Italtel's and Italcom's international presence, begun in 1983, has been extended to seven countries.

The 1985 results are again a point of departure for us toward new goals.

Percentage of Electronic Output in Total Production:




Key:

1. Other output
2. Telematics
3. Transmission
4. Public telephone service

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WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

## ITALIAN RESEARCH PROGRAM IN MICROELECTRONICS

Rome CRONACHE DEL GRUPPO STET in Italian May 86 pp 20-22

[Article: "The National Microelectronics Program"]

[Text] For those who had been asserting for some time that and with some reason that scientific research was the "Cinderella" of Italian industry, 17 April 1986 may have been the historic date on which their worst dreams finally failed to come true.

Indeed, last 17 April, the IMI (Italian Credit Institute), represented by the minister of Scientific and Technological Research, the Hon Luigi Granelli, concluded an agreement with SGS Microelectronics on a research contract under the National Microelectronics Program. This agreement involves the technology and configuration of VLSI's, very large-scale integrated circuits.

The origins of the program go back to 1982, when it was first concretely stated that the Italian scientific and industrial system in microelectronics needed support.

The CIPI (Interministerial Committee for Industrial Planning) realized that individual companies would have real difficulty in pursuing an objective that exceeded their scope and activities. On 8 June 1983 it finally approved the National Programs for not only microelectronics but other sectors considered particularly strategic for national development, especially chemicals and steel. The project was initiated last April, when an initial contract for 55.7 billion lire was signed in the presence of Granelli; Dr Arcuti, the president of IMI; Dr Graziosi, STET [Telephone Finance Corp] deputy administrator; and Mr Pistorio, SGS deputy administrator. This signing is considered important because it takes Italian research out of isolation in a sector of strategic importance for an advanced industrialized country and also because it constitutes a partial demonstration of the understanding that failure to meet the challenge in microelectronics is tantamount to leaving the country marginal and backward on the international scene, a condition that would be hard to overcome. But that is not all.

The signing is important also because the naming of SGS as the head committee of a group of 18 partners from industry, research centers and the universities* means that a historic isolation is being broken for the first time by this long-awaited three-way collaboration between industries, research centers and the universities.

The project will consist of two phases. The first is a 2-year phase that studies VLSI design and technology, namely all the problems connected with the large number of elementary components contained in a silicon chip and the continually increasing complexity of integrated functions.

The second phase, which has not yet been approved, is scheduled to last 3 years; at the end of the 5 years projected, the project will have studied even more advanced VLSI designs.

Particularly important is the fact that the current project has a strictly industrial orientation. This will tend to produce technologies and products for further use. This aspect of immediate, concrete application distinguishes the project from others presently under way.

Another feature is the formula provided for research collaboration and unification at the national level. The purpose is to bring together projects that have thus far proceeded in parallel among the partners. Provision is made for collaboration between industrial laboratories, the CNR and industry in addition to the universities. They will dedicate themselves to the study of particular phases of the process and to the planning of advanced designs by joint use of instruments and technologies developed in the course of the project itself.

In this context, a particular program of study and cultural "dissemination" is to be added to the work of the SGS. In only the first 2 years, 40 research grants will be assigned to the university partners and the CNR for research into specific activities that will make it possible, among other things, to enrich the nation with the precious vivarium of a new group of scientists and experts in the field of microelectronics research.

In concrete terms, it involves CMOS processes for geometries with channel lengths as small as 1.2 microns and new instruments for circuit design. VLSI designs will be achieved that can be applied in many sectors such as data processing, telecommunications, continuous-speech recognition, and civilian work.

The CAD Center

The CAD [Computer-Assisted Design] Center is crucial for providing the universities and the partners generally with access to the most advanced circuit-planning technology. The Agrate center is presently being expanded under the auspices of the SGS to meet the new requirements resulting from the signing of the program.

The Center will be made up of a complex of terminals and workstations that will make it possible to use software packages to perform the complete cycle of integrated circuit planning.

The Center's function will be to make available to the partners up-to-date instruments compatible with the SGS manufacturing process. An essential aspect of the basic philosophy is that allowing large industry access to the Center will create a true meeting of technologies that will enable the other partners to have access, perhaps for the first time, to a new environment where they can use silicon chips to solve circuit problems that could not otherwise be tested.

This latter option once again reflects the Agrate company's intention to guarantee to not only the whole group but the whole country that it will maintain a strong presence in microelectronics and will be the focal point for the transfer of technological and systems expertise acquired in long years of experience on the international scene.

The New VLSI Center

Beginning in the second year, technological development and the creation of prototypes will be handled by the Pilot Line, which will be installed in the new high-tech SGS factory presently under construction.

The new laboratory is scheduled for completion in the first half of 1987. It will be equipped with cleaning, anti-vibration and fluid-purification facilities that will make it possible to work with structures less than a micron in size.

The first phase of the research commission's work will conclude in the course of a 2-year period, and industry will have immediate use of the results obtained. At the same time, new knowledge will have been acquired that will hopefully constitute the basis for a second phase in which new technologies and even more highly advanced VLSI configurations will be developed.

But what counts most is that in these 2 years synergies will be formed that would have been hard to create without the motivation of the National Electronics Plan and that could have hardly continued to grow or even exist without the support of the second phase of the project.

FOOTNOTES

* Industries: Italtel, Elsag, Olivetti, Zeltron, Selenia, Marconi Italia.
Research centers: Iselqui, CSATA
Universities: Bologna, Catania, Modena, Pavia, Genoa, Milan

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CSO: 3698/661

WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

## BRIEFS

NEW ITALIAN FACTORY AUTOMATION FIRM--The Elsag company of the Selenia Elsag subgroup of the IRI-STET group has formed the Proma company (integrated office machines planning) in Padua in joint participation with the Salvagnini company. The Proma company will operate in the field of factory automation. Elsag will have a 51 percent controlling share of the new company [Text] [Milan NOTIZIE ITALTEL in Italian 24 Jun 86 p 3] 8782

OLIVETTI GAINS CONTROL OF GE-DA--Olivetti and Ge-Da, one of the largest independent computer service companies in Italy, have agreed to form a joint venture in the area of data processing and transmission services. The agreement provides for the creation of a joint stock company (Olivetti 51 percent, Ge-Da 49 percent) in which Olivetti and Ge-Da will combine to furnish Infonet system services. Infonet is the most extensive data transmission network in the world, and Ge-Da has exclusive rights to operate Infonet in Italy. Ge-Da will also contribute other data processing services it has developed, except that Ge-Da will continue to operate autonomously in the field of software development. [Text] [Milan TECNOLOGIE ELETTRICHE in Italian Jun 86 p 2] 8782

CSO: 3698/661

EAST EUROPE/BIOTECHNOLOGY

# USE OF BIOTECHNOLOGY IN CSSR TANNING INDUSTRY

Prague TECHNICKY TYDENIK in Czech No 34, 19 Aug 86 p 7

[Article by Eng Frantisek Volek, candidate of sciences: "Biotechnology in the Tanning Industry--What Is Going on at the Research Institute of the Leatherworking Industry at Gottwaldov"; first two paragraphs are TECHNICKY TYDENIK introduction]

[Text] One of the areas connected with biotechnology is the tanning industry. Prehistoric man already knew the art of processing animal hides in solutions of plant tanning agents. It can be said that the tanning of hides was one of the ancient biotechnologies because the processing of animal hides in solutions of plant tanning agents took place in a fermenting environment in which organic acids, which were the results primarily of acetic acid and lactic acid fermentations, played an important role in binding tanning agents to the hide substance.

Similarly, the mordanting of tannery pelts (the depilating of hides) had its origin in the distant past. Mordanting continues to be based on the utilization of the enzyme effect, particularly the effect of proteolytic enzymes. Today, however, the above purpose is served by the application of precisely defined enzyme preparations, produced either from the pancreatic glands of animals or as a result of the fermentation of microorganisms, particularly of bacteria or molds.

The Research Institute of the Leatherworking Industry at Gottwaldov has devoted extraordinary attention during the last decade to the technology of depilation and mordanting. For reasons of protecting the environment, as well as to attain a higher quality of the resulting fur, particularly materials based on pigskin and goatskin, existing methods were replaced by the application of enzyme technologies. The above-named biotechnologies which involve the use of proteolytic enzymes are already in use in the plant which produces glove skins and which processes 3,000 long-fur goat skins per day, and in the plant which processes 700-900 tons of pig skins for footwear purposes per year. The efficiency achieved with respect to quality bristles and furs, in comparison with previously used technology, has doubled, processing in an enzyme bath substantially reduces the amount of fat in the hides, which facilitates their separation from wastewaters following defatting and debristling operations, the consumption of energy is lower by more than 30 percent and

fewer toxic substances (particularly sulphide) are produced and released into wastewaters.

The finding that the use of enzymes or their combinations leads to an intensive defatting of hides is already being utilized operationally, particularly in soaking pig skins at the "Antonin Zapotocky" Works at Trebechovice. In Czechoslovakia there is a gradual replacement of pancreatic mordants, which has been ongoing since 1982. Currently, 30-40 percent of the usable mordant preparations have been replaced by using alkaline protease. Approximately 40-fold less of this substance is imported than is the case of classic pancreatic enzymes.

Systems for mordanting hides in acid baths involving the pickling of hides, that is to say, in acid processing prior to chrome tanning, are beginning to be developed. For this purpose, acid proteases are being developed and produced as enzymes for the second stage of mordanting.

The further development of tanning biotechnologies is aimed at utilizing enzymes in processing protein wastes arising in tanneries. This will be largely a question of intensifying existing processes in processing glue stock, in producing glue, or possibly even in processing already processed leather scraps. Enzyme technology can be applied even in obtaining wool from hide residues or fur from rabbit and hare skins.

The system of biologic cleaning of tannery wastewaters with the use of activated sludge, which results in the decomposition and utilization of numerous contaminating materials as a result of the use of activated sludge, can be identified as a specific biotechnology. This method of biotechnological cleaning has been realized in the erection of cleaning facilities at the Svit Plant at Otrokovice and at the tannery at Bosany.

The comprehensive utilization of biotechnologies in the tanning industry is progressive in terms of technology, economy, and ecology. The tanning industry is closely connected with the development and utilization of specific biotechnologies, particularly with the utilization of enzymes in processes which prepare hides for dressing operations.

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CSO: 2402/35

EAST EUROPE/COMPUTERS

# COMPUTERS IN SCIENTIFIC RESEARCH

Budapest INFORMACIO ELEKTRONIKA in Hungarian No 3, 1986 pp 167-170

[Article by Zsuzsa Szentgyorgyi: "Computerized Information Processing in Scientific Research", based on a lecture given at a seminar held by the Computer Technology Applications Main Department of the Central Statistics Office and the Economic Sciences Institute of the Hungarian Academy of Sciences, 24-25 September 1985]

[Excerpt] It is well known that in Hungary national research and development programs (OKKFT [National Medium-Range Research and Development Plan]) serve to accelerate the development of certain areas of outstanding importance economically or socially. In addition, so-called ministry level research and development programs, involving one or more national authorities, function to encourage other essential, forward looking applications and developments. Such stressed programs were also started by the Hungarian Academy of Sciences (MTA) in the the 1981-85 plan period, the so-called medium-range research programs (KKP). One of the Academy's medium-range research programs, there are a total of six, was the KKP/3 "Use of Computer Technology Research" which had the following goals:

--to create for a few basic scientific areas (social sciences, medical biology, nuclear technology, chemistry, geology) the computer technology methodological background essential for their development, and

--to lay the foundations for theoretical-disciplinary applications of areas (image processing, automation, distributed systems) which build organically on computer technology.

The six subprograms of the KKP/3 are bound together by joint use of the system of computer science and computer technology tools. We might summarize the goals of the several subprograms as follows:

1. Within the framework of the subprogram for social science applications are creation of a model computerized psychological laboratory system, development of sociological, history, linguistic and musicology data files of scientific value, access to the data management systems necessary for these and a further development of data analysis procedures.

2. The goal of the medical biology applications subprogram is development and adaptation of computerized methods for, among others, computerized study and simulation of the structure and functioning of neuron nets, analysis of models describing the dynamics of the cell membrane and computerized simulation of the effect of certain bioactive materials.

3. The computerized image and signal processing subprogram is aimed primarily at the solution of software tasks, the development of fast semi-parallel and parallel algorithms and various image and signal processing procedures for various use areas (medical-health affairs, biology, materials testing and X-ray testing tasks, space research, robot control and manufacturing monitoring applications).

4. The task of the nuclear measurement and computer technology subprogram is development and creation of computerized methods for control of accelerator equipment, evaluation of data from nuclear measurements and automatic processing of track chamber photographs.

5. The goal of the software and hardware subprogram for highly complex systems is to prepare for computer technology applications in the research programs of the periods to come and to solve concrete tasks (e.g., research on the structural and organizational problems of complex material and information processing systems, distributed planning office and automated laboratory systems, computer aided system description and design and tasks arising in the area of the earth sciences and technical chemistry).

6. The subprogram for research on distributed computer systems has the task of studying the architectural and functional questions of these systems in a heterogeneous computer network environment. The chief tasks of the subprogram are to develop a linguistic structure for a distributed system and to perform functional studies to discover and design the properties of operating systems and algorithms operating distributed computer systems.

As we come to the end of the plan period we can evaluate the effectiveness or lack of success of this program. The evaluation is greatly aided by the fact that half way through the plan period, one and a half years ago, the results achieved up to then and the further tasks were debated at an all day conference with broad participation--bringing in those participating in implementation of the program and the research and industry users who might be considered. On the basis of all this we can say that this program played an extraordinarily useful role and without it domestic scientific research would have lagged in the deliberate use and organic adoption of tools and methods which are at the forefront and which encourage progress. We might mention as a no less positive fact that the program was realized with very broad participation; the larger part of the Academy's research network took part in it. (I consider it very important that the National Technical Development Committee also contributed to the program by giving advice and with significant financial assets. This contribution greatly aided the successful preparation and realization of the medium-range research and development and applications programs for the coming plan period--e.g. the OKKFT program G/1 supporting the spread of electronification.)

In the following I will talk about those ideas on the basis of which we want to create a computer background for scientific research in the Academy's research network. It must be noted first of all that in an unfortunate way the supply of such tools for the research network of the MTA lags far behind not only the normative values of the economically developed countries in the forefront of the world but also behind the inventories of the surrounding socialist countries, both quantitatively and qualitatively. The backwardness averages about 7-10 years, but the average values often falsify and hide the actual facts. The situation is more favorable in the case of microcomputers and personal computers--the backwardness here is quantitative--but our disadvantage is more significant in the case of the large computer background and telecommunications services. At the end of 1984 there were 77 minicomputers and 90 microcomputers in operation in the research network, the great majority of them smaller capacity models. As for the large and medium computers the table shows our status here. It can be seen that among the medium computers there is one which is now 14 years old and its capacity can be compared to that of a professional personal computer. The large computer of the Academy went into operation 5 years ago and today can be regarded as of medium capacity at best if we consider the progress that has taken place since. To this must be added the unfortunate political circumstance that for embargo reasons some of our research sites--including the most important--cannot use the IBM machine. The ESZ 1045 computer now being acquired can be called of medium size at best; it is far behind the world leaders in capacity, services and the price/performance ratio.

| Operating institution | Computer type | Memory capacity | Background (disk) | Put into operation |
|---|---|---|---|---|
| SZTAKI | IBM 3031 | 2 M bytes | 600 M bytes | 1980 |
| SZTAKI | CDC 3300 | 256 K bytes | 168 M bytes | 1971 |
| SZTAKI | ESZ-1035 | 1 M byte | 270 + 1,600 M bytes | 1980 |
| KFKI | ESZ-1040 | 1 M byte | 638 M bytes | 1977 |
| KFKI | ESZ-1045 | in the process of acquisition | | |

SZTAKI=Computer Technology and Automation Research Institute of the MTA
KFKI=Central Physics Research Institute of the MTA

As for software supply, it shows a somewhat more favorable picture, compared to hardware; indeed the program libraries for the large machines are adequate even in an international comparison. Here also problems are caused by the fact that because of the limitations of the hardware some of the software cannot be used effectively. The supply of programs for mini and microcomputers is not so even or well tested as that for the large machines (this is true in other countries too). For example, we lack software tools which can be used for systems serving special needs (graphics, real-time, etc.).

Several years ago the MTA started to build up an extensive computer network (the ASZH, or Academy Computer Network). We had in mind primarily service to provincial research sites because easily demonstrable savings derive if the researchers do not have to get on the train and spend half a day or all day just to get at the central resources. At present users can access about 50

percent of all central computer resources of the Academy through the network; this value is about 70-80 percent for the IBM computer.

We already dealt with the spectrum of research uses. These are very differentiated and dynamically changing needs the larger part of which require network or computer center services while a smaller part, very essential from the viewpoint of research, require special services (graphics, real-time use, analog-digital transformation). Taking all this into consideration the developmental policy of the MTA in regard to the computer infrastructure has designated four directions, closely interdependent and in this case building on one another:

--further development of central service building on the large computers;

--further development and modernization of the extensive network;

--building up local networks based on megamini machines, taking the special needs into consideration;

--installing (professional) personal computers for smaller applications and data preparation and linking them into a network later.

We must consider a number of factors in regard to development:

--The existing software inventory must be saved for and used in the next period. So we must continue the two large computer lines followed thus far. One is the services and networks based on the ESZR (IBM) large computers while the other is the systems using the TPA (DEC) mini or megamini machines.

--We must increase the supply of professional personal computers and this must be based on uniform types--in the interest of effective, mutual software use and the economicalness of service and follow-up service. We must strive to develop uniform use common databases (an already existing example of this is the common database created by the social science institutes which they intend to develop continuously).

--The workstations installed at the several research sites must be suitable for independent work site processing, cooperation in a local network and participation in the extensive network environment.

A Few Words About Economicalness

Can one even speak of economicalness in the case of scientific research? In this case simple numerical indexes would be most misleading and false. To know the world, acquire new information and lay the foundation for its acceptance is just as much a fundamental necessity for developing and maintaining the economy of a country as culture and education--and its effects are similar to the latter.

Even less can one show by quantitative means the economicalness of the computerization of research. But it is a fact proven many times over that modern research can no more do without computer technology than it can do

without instruments and research equipment. What is the use of an experimental reactor, a mass spectrometer or an instrument based on magnetic nuclear resonance? The use of them appears indirectly in new information, in new tools going into production, in the effectiveness and profitability of the applications. It is true that Ramon Lull did not succeed with his logic machine in converting the infidel Muslims to the Christian faith and that Charles Babbage did not make in workable form, in his lifetime, a computer (the integral machine) to perform the astronomical calculations needed for navigation, but still it is out of the ideas, plans and devices which seemed useless then (among other things) that we build the machines, equipment and systems from which entire branches of industry and millions of people live today.

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CSO: 2502/81

EAST EUROPE/COMPUTERS

## TPA-11/540 MEGAMINI COMPUTER BEING DEVELOPED

Budapest IMPULZUS in Hungarian No 13, 28 Jun 86 p 27

[Article by Katalin Magos: "16 Bits A Year"]

[Text] At fairs the enterprises still display hastily improvised, often inoperable equipment as finished products. So the sign "under development" placed on the 32 bit megamini shown at the stand of the Central Physics Research Institute (KFKI) of the Hungarian Academy of Sciences at the spring BNV [Budapest International Fair] was all the more surprising.

The central unit is completely finished, I know; all that remains is to get it going and assembled with peripherals to have a complete system. The development, after a long period of testing, can be regarded as finished, that is, if it is suitable for running the applications system. According to their plans this could happen at the end of 1986 or the beginning of 1987. With the TPA-11/540 computer, now being born, the researchers of the KFKI are stepping from the world of 16 bit machines--just last year such a member of the family, the TPA-11/440, won the grand prize at the BNV--into that of the 32 bit ones.

In the fact sheet one can read the following about the "skill" of the machine: With its 32 bit instruction set and architecture the TPA-11 opens a new dimension in the area of applications. Its complete compatibility with the widespread "industry standard" computer family ensures a very large program background.

"Computer types with a modern parts assortment (highly integrated) and compact style which are compatible with the VMS operating system--such types enjoy OMFB [National Technical Development Committee] support--have an outstanding role in the electronification program of the Seventh 5-Year Plan," Gyorgy Komlos said. "As for applications and user programs," he continued, "they are amply available for many of them have been made around the world. Naturally new ones must be made for custom tasks, or the existing ones must be adapted, but the KFKI researchers will gladly undertake to do so."

The developers recommend the megamini computer for office automation, measurement and data collection, process control, data processing, business mechanization, expert systems and CAD/CAM applications.

The researchers intend to assemble their first model system to take care of the technical computing needs of the KFKI. With a larger member of the 500 series, the TPA-11 580 (at the system level this will have about three times greater capacity than the 540), they would like to develop an automatic engineering design model system.

The TPA-11 Family

| Computer Series: | TPA-11/100 | | TPA-11/400 | | TPA-11/500 | |
|---|---|---|---|---|---|---|
| Members of Series: | 11/110 (Janus) | 11/170 | 11/420 | 11/440 | 11/540 | 11/580 |
| Word length (bits) | 16 | 16 | 16/32 | 16/32 | 32 | 32 |
| Operating memory min-max (M bytes) | 0.064-0.064 | 0.5-4 | 0.5-4 | 0.5-4 | 2-5 | 2-32 |
| Buses used | QBUS | QBUS | XBUS UBUS | XBUS UBUS | UBUS | SBUS MBUS UBUS |
| Operating system | FOBOS CP/M | Micro-DOS-RV | DOS-RV-PLUS | DOS-RV-PLUS | VMS | VMS |
| Style Desk | yes | yes | -- | -- | -- | -- |
| Style Floor | yes | yes | -- | -- | -- | -- |
| Style Rack | yes | yes | yes | yes | yes | yes |
| Year it appeared | 1984 | 1986 | 1986 | 1984 | 1986 | 1986 |

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EAST EUROPE/COMPUTERS

## OMFB ANNOUNCES LASER RESEARCH COMPETITION

Budapest IMPULZUS in Hungarian No 13, 28 Jun 86 p 27

[Text] The National Technical Development Committee (OMFB) is announcing a competition for technical development tasks to be realized in 1986-88. The goals include laser research.

Proposals can be submitted for the following areas:

--modern technologies suitable for industrial applications, the development of devices and equipment connected with these and putting the latter into production;

--development of products using lasers and putting them into production in the areas of materials processing, metrology, laboratory technique and therapy.

The time limit for the competition (the final time limit for realization of the project) is 30 November 1988.

The time limit for submitting proposals is 15 July 1986.

Proposals must be submitted in four copies to the OMFB (8 Martinelli Square, Budapest V) by 15 July 1986.

Research sites and manufacturers can apply for the competition. The time limit for evaluating the competition is 31 August 1986.

One may consult with personnel of the OMFB in connection with enrolling for the competition. The OMFB person dealing with the theme is Istvan Bernat, chief engineer (8 Martinelli Square, Budapest V, telephone number 175-900 extension 323).

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# HUNGARIAN POST OFFICE PREPARES TO IMPLEMENT NEW RADIO SERVICE

Budapest INFORMACIO ELEKTRONIKA in Hungarian No 3, 1986 pp 177-180

[Article by Istvan Baka and Erno Megyeri: "Selective Paging; Preparing For a New Radio Service at the Hungarian Post Office." The first paragraph is the Hungarian language summary.]

[Text] Theme codes: 51 (services), 47 (communications).

The various tools and solutions of computer technology are spreading more and more even in areas which do not belong to the sphere of "technical-scientific tasks" or "data processing." It is the intention of our editors to show the achievements in what are still the border areas of ever expanding informatics, in addition to the traditional applications represented with decisive weight. The following article belongs in this category; it gives a brief description of the introduction of selective paging in Hungary. (Arrived: 3 December 1985.)

Radio and television provide programs to more than 90 percent of the area of developed countries. (In our country this value is 80-90 percent depending on the type of broadcast.) This fairly good ratio, the large number of receivers and not least of all the technical characteristics of the transmitting equipment create the possibility of sending special information to almost every part of the country in addition to but independent of the broadcast. The technical possibilities have met with ever more strongly manifested needs. It is understandable and just if people desire to be "accessible" in any part of the country at any time of day for messages connected with work or private life.

The obvious solution is a new radio service, selective paging. The purpose of the new service is to use the telephone and radio transmitter network to get a message to a subscriber anywhere in the country who has a special receiver. The message can be displayed in the form of a sound signal, decimal number or numbers, alphanumeric printout, graphic signals or speech.

## Introduction

The transmitting of messages is a postal service introduced quite long ago. Its essence is that a message of definite length can be left with the service

at the given phone number and it will be read when the addressee inquires. The paging system which can be used in a hospital, department store or block of buildings is widely known. A small device which can be carried in a pocket or on the lapel warns its owner by "beeping" that a message waits in the center.

Obvious limits restrict the mass use of both systems. The latter can extend to only a limited area and the limit on the former is the restricted time and the exclusion of an unexpected message. Actually a further development of the local message system, expanding it with a personal call, is a paging service which transmits the message to any part of the country, by person--even in cases not agreed on in advance.

In regard to its telecommunications tools the system is based on exploitation of possibilities offered by the telephone network, the radio network and computer technology. Figure 1 illustrates in simplified form the systems technology of the message forwarding service. After calling the given number from any telephone we give the message and the number of the person being sought. Then the radio transmitter equipment broadcasts, coded in an appropriate way, the personal number and the message. A receiver suitable for use in the system receives the coded message; the set of the person called--and only the set of the person called--transforms it, gives a signal and writes out the message.

Personal paging systems with different structures are used by different countries depending on their telephone and radio transmitter networks. The various solutions can be grouped on the basis of the calling system, the transmitter network and the message transmitted.

The calling systems can be differentiated in the way the number of the subscriber and the coded numbers of the message (15-20 digits) reach the transmitter equipment. In the case of automatic transmission it is possible to dial these groups of numbers continuously. With semi-automatic transmission, after dialing the number of the service, the other number codes are put into the system with the aid of auxiliary equipment. In the case of a manual switching calling system, after dialing the telephone number of the service, the person called and the digit code of the message must be given verbally to a dispatcher service.

From the viewpoint of the transmitter network there are systems operating with an independent radio transmitter network (created for this purpose) and systems operating by secondary use of the broadcast transmitter network. The latter carry out the personal paging task simultaneous with but outside of the program broadcasting.

The services in use are most varied from the viewpoint of the message transmitted. The simplest is a sound signal alerting that there is a call, after which the message can be obtained by calling an agreed upon number. (This can be the place of work, one's residence, a post office, etc.) There are also systems for number codes (one or more decimal numbers), letters (writing out a few words) and verbal message transmission.

Use Possibilities

The system might be used for the following purposes:

--reducing "empty" kilometers in the area of enterprise vehicle management by sending information on route changes;

--circular calls to notify and bring together health services (urgently needed teams, blood donors, organ transplant people, etc.) and certain groups of the armed bodies;

--to quickly find prominent people;

--to inform those with mobile occupations (journalists, actors, service artisans, etc).

And we might mention the possibility of additional, collateral services outlined in the course of development:

--relieving the burden on and supplementing the wake-up service of the Hungarian Post Office;

--extending the precise time service to operate clocks in public squares and other public places;

--switching on and off devices using electricity;

--giving an alarm at a given time or immediately, with one or more devices (e.g., a siren);

--carrying out traffic organization tasks.

The explanation of the significance of the latter is that one can use a permanently installed type of receiver tied to a given place. The requirements made of these receivers are easier. Power consumption need not be reduced to such a great degree because they can be connected to the existing electric grid. The too great reception sensititivy can be compensated for by an external antenna. The special, difficult to obtain parts used in portable sets in the interest of smaller size can be replaced here by those of somewhat greater size.

Domestic Experiments

In order to solve the tasks described above, partly to supplement the domestic telephone network, partly to take its place and on occasion to relieve the burden on it, the Hungarian Post Office began a study of the domestic feasibility of the new service, taking into consideration the conditions of our radio transmitter network. The technical and economic possibilities available and the technical requirements prompted the Post Office to decide for the development of a system which is partly new. In 1984, as the result of several years of developmental work--delayed primarily because of parts acquisition difficulties--an experimental system was set up; the compatibility

tests on it have been concluded successfully and system measurements have begun and are now continuing.

The technical requirements made of the domestic system are the following:

--the system should be based on exploitation of the technical possibilities of the UHF-FM transmitter network;

--it should be compatible with the various services (program broadcast, traffic information);

--the minimal "effective range" should coincide with the limit of the mono program service;

--the system should be fast and reliable;

--the structure of the calling system should be simple;

--circular call and priority possibilities are necessary;

--there should be a way to transmit messages nationally;

--a possibility for subscriber and traffic capacity expansion must be ensured;

--the receiving sets should be of small size and suitable for automatic zone changes (retuning);

--it should be simple to check the operability of the receiver set and of the system;

--the receiver set should be capable of storing 2-3 messages.

The experimental development of the system began keeping these requirements in mind.

The Calling System

Seeing that our domestic telephone network does not make possible the direct dialing of the 15-20 digits required by the service we are using two solutions--parallel with one another. After dialing the number of the service, either one must tell a dispatcher the call number and the message code or one can put it onto the telephone line with the aid of auxiliary equipment developed for this purpose.

The Transmitting System

On the basis of its technical parameters the UHF-FM transmitting equipment is suitable for transmission of a 100 kHz modulation band width. In the event of transmission in the mono mode we use 15 kHz of this; we use 53 kHz in the case of the stereo mode. So there are additional possibilities for information transmission with modulated auxiliary carriers. In our case this information is a suitably selected call and message "number". We modulate the auxiliary

carrier with this binarily coded decimal number and the transmitting equipment broadcasts it by linear summing with the main program.

The planned service will be realized on the UHF transmitter with an auxiliary carrier. Considering that there is significant overlap in the supply of UHF transmitters (the program broadcast by one or two other sites can be well received at the site of every UHF transmitter) the transmission of information can extend to almost the entire country by using the main line network as a retransmission network.

The Receiving Set

A decoder--placed after a high frequency unit similar to the customary program receiver--in the receiving set transforms the personal call signal received together with the program with the aid of logic circuits into a form suitable for display. The information code, or if there is no message the precise time (hour, minute), appears on the display. With the latter one can check the operability of the set on its own and in the entire system. A sound signal alerts one to the fact of a call.

The determining component of the system, naturally, is the central unit, which we will describe only in outline. It is the task of the central equipment to process the calls and information arriving on the telephone line or from the keyboard on the front panel and send them to the UHF transmitter in a form suitable for transmission. Figure 2 shows its structure. The first circuit unit of the equipment is the call receiver (line interface). Its task is simultaneous standard connection of the external telephone lines (stop the ringing, coupling, disconnection) and transformation of the calls or of the messages arriving in various forms into digital code. These tasks are solved by a microprocessor control.

The most important element of the central unit is the microprocessor control unit. In accordance with its own program it ensures the precise pacing of the other services of the personal paging system. The other services are circular calls and priority, which means a common call to a definite group of receiving sets or an immediate call to individual sets respectively. Another task is call repetition. Its purpose is to see that the transmission of messages to the adressee is all the more certain, for it could happen that at the moment of the call the receiving set or its owner was in circumstances which would prevent reception (e.g., a shielded area--reinforced concrete or metal structures--or radio static, etc.). In the interest of the reliability of the system the codes corresponding to the message are transmitted repeatedly. We transmit every message several times one after another, then again after 5-10 minutes (the number of repetitions can be changed). We indicate on the receiving set whether the call is a first call or a repeated one.

In the present developmental phase of the planned new postal service it is an important characteristic of the central unit that its line receiving unit can be controlled linked with a personal computer via the telephone line. With this computerized data input method one can perform transmission measurements on the entire system (bit error ratio, channel analysis).

We also use a personal computer on the receiving side. The computer decodes the calls arriving on a receiving set supplemented with an interface unit and it stores and evaluates the transmission errors.

The unit supplying power to the central unit ensures 24 hours of continual operation and evens out network fluctuations. Since there are RAM type stores in the central unit we need a constant supply of power for them in order not to destroy the stored messages.

Schedule

Preparations to introduce the service have begun on the basis of the system experiments. This consists of developing a series model of the receiving set and beginning manufacture of it, preparing the final central equipment and finalizing the calling system. Taking into consideration the scheduling of the enterprises participating in manufacture we plan to start the service in Budapest by the end of 1986 or beginning of 1987. The expected time for the realization of the complete system with national service is the second half of 1988.

FIGURE CAPTIONS AND DESCRIPTION

Figure 1, page 178, shows, from left to right, the telephone exchange, the dispatcher, the central unit with a personal paging central unit, the UHF-FM transmitter and the paging receiver.

Figure 2, page 180, "Block diagram of central unit," shows, top to bottom and left to right, the retransmission receiving unit (dashed lines), the line interface, the monitoring unit (dashed lines), the Intel 8080 processor with stores, the clock, the clock network input, the digital display, the line printer, the modulator leading to the auxiliary carrier output and the power unit.

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## NEW FORMAT FOR SZAMITASTECHNIKA ANNOUNCED

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 pp 1, 20

[Letter to readers on front page from Dr Ivan Szabo; unsigned notice on back page]

[Text] Dear Readers,

You hold in your hands the last isssue of SZAMITASTECHNIKA, which first appeared in December 1969. For 17 years, the journal has aided the domestic applications of computer technology, the Computer Technology Central Development Program and the national computer technology applications tasks of the KSH [Central Statistics Office] with the unique instruments available to the press.

The paper has been characterized by frequent renewal, quality development and a strong growth in circulation. In addition to reflecting current domestic computer technology life the publishing staff gathering around the journal, constantly growing and strengthening, has tried to indicate the proper direction, taking into consideration the professional policy conditions.

The ceaseless search for paths and desire for renewal which characterize our profession has not left the editors untouched; indeed, they have become important to them. And this explains why the journal is ending its operation in this form and will continue its work, in a few months, amidst much more promising frameworks, on a broader professional base.

While the computer technology information infrastructure has broadened during these 17 years and, especially in the last few years, a number of new domestic press products dealing with computer technology, with different approaches to it, have appeared the leadership of our journal--giving way to the voice of the times and the demand for further development--intends to open new paths for the journal, for the professional representatives of the speciality, and for our readers.

It was in this spirit that the Computerworld Informatics Limited Liability Company was formed in March. The founders of it are Computerworld Communications Inc. (CWCI), the largest computer technology journal publisher

in the world, the Journal Publishing Enterprise and the Statistical Publishing Enterprise of the KSH.

After preparatory work, the new journal, SZAMITASTECHNIKA-COMPUTER WORLD (SZT-CW), will appear for the first time in the middle of September with a larger format (32 pages), in a greater number of copies and with more advertisements. Subsequently, it will appear three more times this year. Our plan calls for biweekly publication as soon as possible, thus providing the fastest possible publication of information.

In compiling our materials, we will use the database maintained by the more than 500 experts of the CWCI and by the International Data Corporation (IDC), one of the most significant computer technology market research and analysis undertakings of the United States, a database which can be queried daily from a terminal. Naturally we will supplement the items from these with information from other sources.

We hope that by publishing more colorful and fresh information and by increasingly involving domestic computer technology development and manufacturing institutions and enterprises and users, our journal will be an increasingly intensive intermediary for the acquisition of the newest technology.

We ask the kind understanding of our readers that our customary August-September combined issue will not appear, as a result of the change-over. Present subscribers will receive the new journal this year at an unchanged price, we will make up for the one month lost by increasing the contents. More information on subscriptions to the new SZT-CW can be found on page 20 of this issue.

Dr Ivan Szabo

SZAMITASTECHNIKA-COMPUTERWORLD

The new paper, SZAMITASTECHNIKA-COMPUTERWORLD, will appear monthly in 1986, on a total of four occasions. Former subscribers to SZAMITASTECHNIKA and those members of the NJSZT [Janos Neumann Computer Science Society] who have been getting it as their membership journal will receive it automatically at an unchanged price until the end of the year. In addition, the journal can be purchased at news stands. According to our plans the SZT-CW will appear twice monthly beginning 1 January 1987, so we recommend subscribing from this time on also. We will inform our readers in detail about subscription fees and methods in our first issue, September 1986.

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# COMPUTER TECHNOLOGY OUTGROWS BUDAPEST INTERNATIONAL FAIR

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 pp 1, 5

[Article by Dr Ivan Szabo: "We Have Outgrown the BNV (Budapest International Fair)! Will There Be a Separate Exhibit in 1987?"]

[Text] We were witnesses to the crowning phase--perhaps--of a trend which could be well followed for years: Computer technology, organization techniques, process control and microelectronics have been representing themselves ever more strongly at the fair for investment goods, while at the same time there has been virtual hand-to-hand fighting to get into some elite pavilion, independent of what profile is represented by the party trying to get in. We can attribute to this, for example, the fact that a French firm displaying food industry machines appeared this year in Pavilion A--a site having political significance as well--filling that part of the hall with a fine aroma. While the exhibitors of our profession were characterized by the greatest dispersion thus far, which greatly reduced the effectiveness of the exhibit and the possibility of surveying the trends. Thus, for example, Rolitron, one of the best prospering domestic small cooperatives, blushed in an almost humiliating way in a shed referred to as Pavilion 30. Seeing this, much turns around in the head of a person.

The first thing is that the BNV has outgrown the area of this fair, and only some of its pavilions are suitable for a quality exhibit. Secondly--and this is more important for us--our profession, marshalling more than 150 exhibits, has outgrown the BNV! It is time to deal at the government level with the idea--and this is not foreign to the leadership of Hungexpo--that in the future our profession should be separated from the BNV and should hold a separate exhibit, in April for example, amidst much more elegant conditions, using the best pavilions, in professional groupings which might serve equally the interests of the exhibitors, the experts and Hungexpo with them.

The exhibit--the computer technology and organization techniques part of it--was supported for the first time in the history of domestic fairs by a really useable, computer aided information system, SZEKIR, which was developed, loaded and operated by people from Datorg. With the already mentioned high degree of dispersion this new and professional information service was needed because of the increased demand for synthesis, analysis, market surveys, etc.

The Exhibit Information System for Computer Technology and Organization Technique Devices (SZEKIR) operated in addition to and independently from the Fair Information System (VIR) of Hungexpo which has been known for several years. While VIR was connected to the Siemens computer of Datorg through a terminal the designers of the system based SZEKIR on a floppy disk microcomputer and it operated outstandingly throughout the fair, offering information on the screen or through a mosaic printer. Representatives of the SZVT [Computer Technology Enterprise of the Csepel Works] guiding preparations for Orgtechnik '86 looked at the system and discussions have begun about its use this year.

As for the sad event which did not take place at the fair but which coincided with the program, the fire at the MEV [Microelectronics Enterprise] which caused catastrophic damage, it is still difficult to survey the direct and indirect effect it will have on domestic manufacture. In an unfortunate way this accident, affecting the entire electronics program (EGP) now starting up and accompanied by virtually inconceivable damage, will affect primarily or exclusively the manufacturers of professional devices and not the amateurs--who, in any case, in my opinion, should have a share of the restrictedly available capitalist relationship microelectronic elements on the basis of a more correct, better thought out distribution.

A person who wants to learn at fairs and exhibits about the accessible computer technology and organization technique devices and about the services which can be made use of really has nothing to complain about in Hungary. This year already there was the national microcomputer meeting called Micro '86 and, within this framework, the SZM-SZM (computer technology belongs to everyone--computer technology for everybody) exhibit; and Orgtechnik '86 will come this fall. There have been and will be events in the capital and provinces held for smaller special areas or applications sectors but exhibiting a number of new, interesting devices and services.

Despite the difficulties mentioned above we would like with this report to call attention to a few points of emphasis, interesting phenomena or trends on the basis of what was seen and heard, recalling where necessary the impressions and experiences we gathered at last year's BNV.

Well, the first impression was a feeling of growth. A very large number of organizations appeared with offerings on the supply side vis-a-vis solvent demand.

Seeing all this one gets the impression that a customer's market is developing. This is strengthened by the favorable price trends. (Many announced significant price reductions at the time of the BNV, or at least for the duration of it.) We should emphasize that our observation pertains not to the price level but to the change in it over a year. On the list provided by SZEKIR in response to those seeking microcomputers and personal computers one can find 30 Hungarian organizations which offer complete computers. (In addition there were at least as many--partly or entirely--domestic organizations offering subassemblies or services.) Many of them offer products of foreign origin for forints, behind which there is foreign exchange cover deriving from cooperation activity or from bringing in private resources. In

this case, of course, the foreign exchange multipliers made up of numerous components have a braking effect on the favorable price trends noted.

With the joyful fact of a broad offering it may appear to be picky to mention that our obsession of last year remains: In some areas a greater concentration of forces and of capital and larger manufacturing series size might yet accelerate the undoubted development.

In accordance with our traditions the reader will find in our following articles evaluations of the fair from special points of view. But even in an overview we would like to call attention to a few news items and things of interest.

--At the time of the BNV Videoton signed a contract worth 68 million rubles with its Soviet partner on the basis of which it will deliver ES 1011 and VT-20 computers, line printers and subassemblies for them. An additional contract worth 50 million rubles is expected this year for the export of computer technology equipment to the Soviet Union.

--So far the Instrument Technology Small Cooperative has sold about 600 computers. The 16 bit systems make up the larger proportion of the sales today.

They have sold the license for the Multicenter-Turbo 8 bit multiple work station system in the FRG; the Schneider firm there has tested it and it is being put into production. The new computer of the small cooperative is the EASTSTAR M 16 work station system with which they would also like to get on the Western European market.

--The KSH [Central Statistics Office] SZUV [Computer Technology and Management Organization Enterprise] and the RAAB computer technology branch (New Corn Ear Agricultural Producer Cooperative, Gyor) are preparing to form an economic association to sell hardware and software tools (complex user systems, local networks, service activity, continuing consultation, etc.).

--Since 1985 the Rosytext text editing equipment of the Rolitron Technical Development Small Cooperative has gone into more than 500 domestic offices.

--The Datacoop Small Cooperative has appeared with two significant products also: the DCD-KZ 650 fabric tape ink cassette and the DCD-CZ 185 correctable carbon tape cassette.

--It is gratifying that several Hungarian and capitalist firms exibited together and jointly sell computer technology equipment (Softinvest, Datacoord, Technocomp, etc.).

--On the basis of market and professional successes one can already feel that a very strong leading field has developed among the small cooperatives.

--Every IBM device exhibited offered the possibility of using a Hungarian character set. It was also noted at the exhibit that the world firm has been operating in Hungary for 50 years.

--The Polish firm Elwro has put more than 30 teleprocessing subsystems into operation in Hungary thus far. They recently began talks with their Hungarian partners about starting several cooperation projects. They are preparing computer technology cooperation with Metrimpex.

--Two observations suggest themselves in connection with this year's appearance of the Japanese firm Epson. One involves the very rich exhibitor's program; the other its unworthy hiding in a box which could not easily be found--in Pavilion A, it is true.

--The Interag Joint Stock Company, on behalf of Elbatex, exhibited the world level matrix printers of Fujitsu; the Datacoord-Morgenstern firms jointly exhibited the high resolution CRT screens, mosaic printers and electronically controlled K-B500 writing tablet of Panasonic.

--The number of exhibitors of local networks at the fair increased compared to last year too. But they were characterized by a high degree of incompatibility and different architectures. It would be good to know what means--if any--might have the effect of a rational reduction in variety, because I am convinced that this is needed.

--The domestic strengthening of CAD and robotics was gratifying; there is an ever broadening and more complex appearance of these two crucial tools for our technical development. Perhaps in the near future there could be a special exhibit too.

--Unfortunately the long awaited series manufacture of a domestic Winchester technology at the MOM [Hungarian Optical Works] is still being awaited.

--Appearing as new items: the SZKI [Hungarian Computer Research and Development Center] with its OCR page reader and Proper-16 based text editing system; the MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences] with a "mouse" developed by it; and the KFKI [Central Physics Research Institute] with its dual processor plans.

--We were happily persuaded that there has been a strengthening of the domestic applications software supply and market!

--But in the news about devices one must mention the offering of mini systems, broader than last year. We discovered eight systems in which the signs of DEC compatibility strengthened further in both the mini and supermini category.

In conclusion we want to call attention to the price cavalcade and manpower migration characterizing the spring of 1986. Our old acquaintances turned up at "alien" stands to offer their explanations, having exchanged their old jobs for something new, something more hopeful.

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## NEW MINICOMPUTERS, MULTIPLE WORKSTATIONS SEEN AT BUDAPEST FAIR

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 2

[Unsigned article: "New Minis, Multiple Workstation Systems"]

[Text] One new member each of three different series of the TPA-11 family appeared at the exhibit of the Central Physics Research Institute (KFKI). They presented two new minis in addition to the TPA-11/170 microcomputer. The TPA-11/420 minicomputer is a high performance machine using the 16/32 bit architecture of the TPA-11/440 which won the BNV [Budapest International Fair] grand prize last year. The seven card processor of the 11/440 has been realized on one card thanks to technological development and the use of more highly integrated elements. As a unique possibility it can also be configured with a QBUS adapter, thus it can use the 11/100 and Micro/PDP-11 computers as peripherals. It offers a very good price/performance ratio in the category of machines compatible with DOS-RV Plus. The TPA-11/540 has 32 bit architecture, a central unit based on a bit-slice microprocessor and an efficient instruction set. Compared to the earlier 16 bit TPA machines it makes possible the running of very large, interdependent programs. The floating point processor built in organically with the central unit improves the numeric data processing capability. In its category it is the first Hungarian machine compatible with the VMS operating system.

The systems based on a uniform network which were displayed show that over the long term the KFKI wants to create on the domestic market a "combat-worthy" assortment of larger category (dual processor, multiple workstation) minicomputer systems.

SZAMALK [Computer Technology Applications Enterprise] exhibited the 32 bit, multiple workstation Mikrosztar-32 supermini computer with a DEC compatible architecture. Its chief applications areas are business processing with a maximum of 33 simultaneously active terminals and as a central unit for CAD/CAM systems. In its category the new machine is the first domestic device the operating system of which is characterized by compatibility with MicroVMS. The communications possibilities greatly increase its significance--a synchronous link with large ESZR [Uniform Computer Technology System] computers and an asynchronous link with PC's (IBM, Commodore, etc.), as a terminal concentrator one can connect MSZR [Minicomputer System] and TPA computers, and local network links are possible with very many types of

computers. The Mikrosztar-32, with 4-16 M bytes of operating memory and a 40 MHz clock signal, offers an outstandingly good price/performance ratio. Its operation execution performance competes with that of the DEC-MicroVAX-II. (As an illustration, the internal speed of the MicroVAX-II exceeds by 1.5 orders of magnitude the speed of the IBM PC/XT.) In the line of MSZR machines SZAMALK this year carried out a price reduction of about 30-35 percent. As the result of a reconfiguration carried out on the SZM-1420 in cooperation with the Soviet shipper they displayed at the fair a system with an outstanding price/performance characteristic. With both the expanded and improved SZM-1420 and the Mikrosztar SZAMALK intends to realize the goal of integrating the devices already existing with users into new systems, maintaining the "accustomed" applications environment.

The new MVX-32, multiple workstation computer of the Instrument Technology Small Cooperative has a 32 bit processor and is suitable for high speed fixed and floating point operations. The capacity of the operating memory can vary between 2 and 9 M bytes. The system makes possible the servicing of a maximum of 21 asynchronous workstations. It can be shipped with two sorts of operating systems--the MVX-VMS compatible with VMS is suitable for high performance data processing tasks while the UNIX compatible system supports program development and can be especially recommended for CAD/CAM and network applications.

At the exhibit of the Soviet Union one could find, together with a number of computer technology products, one of the newest members of the MSZR family, the two processor SZM-1600 minicomputer, which can be used successfully to replace ESZ 1020 and ESZ 1032 systems--according to the experts of SZAMALK and of the Soviet exhibitor. SZAMALK plans a detailed demonstration of the system after the fair.

For the first time the Hewlett-Packard firm displayed computer technology devices separately as well. The HP 3000 multiple workstation (a maximum of 28) system appeared at this fair for the first time in a socialist country. Four terminals, printers and two PC 150 contact screen personal computers were connected to the system. In addition to their own software products (Image, HP-Desk, HP-Word and Business Graphics) the visitor could become acquainted with three software products of the SDS firm in Graz (the Hotel 3000 hotel reservations system, a Hungarian accounting program package and a materials management program package) and the materials turnover program package of the Hungarian Matrix Gmk [economic work association]. Their plotters can be connected to about 100 different types of computer.

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# CAD SYSTEMS, GRAPHICS DEVICES AT BUDAPEST FAIR

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 2

[Article by A. K.: "CAD Systems--Graphics Devices"]

[Text] The BNV [Budapest International Fair] provided many new items in the area of computerized designing systems. We will mention a few of these briefly.

The "Coopgrading" clothing industry standardizing spread optimizing CAD system of the AMT Applications and Computer Technology Small Cooperative is made in two versions (L=leather industry and A=textile industry). The A/0 size digitizing table with 0.1 mm precision and independent intelligence is their own development. The textiles technology faculty of the BME [Budapest Technical University] developed the programs needed for the system. The joint development of BME-AMT is the 512 x 512 pixel resolution color display needed to produce finely drawn figures. (They plan to develop a 1000 x 1000 pixel color device by the end of 1986.) The designing of a 2A/0 size cutting-drawing table is under way also. The reference users of the CAD system are OKISZ [National Federation of Artisan Cooperatives] Labor (for the A version) and KAEV [Light Industry Parts Manufacturing and Supply Enterprise] (for the L version).

The COSY subsidiary enterprise displayed an industrial CAD system based on a Variter-AT computer which is being sold with FRG CADdy software which provides very efficient 2-D designing and documentation, industrial level specialized modules and a direct CNC link for machine industry applications.

Within the framework of the Soviet exhibit, in Pavilion A, we could see the CAD system of the Kiev Elektronmas enterprise equipped with ARM2-01 graphics designing workstations. A maximum of four each SZM-6404 graphics data input terminals and SZM-7316 displays can be connected to the SZM-1420 minicomputer.

The VT-32 graphics workstation displayed by Videoton as a developmental prototype is a high performance, 16 bit, single user CAD system. Its graphics control subsystem consists of a fast graphics processor and a 0.5 M byte image store which significantly increases the efficiency of user programs. The images appear on a high resolution color monitor. A PixMan microprogram system supports execution of the graphics operations, the formation of window managed

user interfaces and GKS and VDI (virtual device interface) functions. Sale of the system will begin at the beginning of 1987; Videoton is now seeking a reference user to whom it might ship a workstation this year. Appearance of the 2-D GKS, VDI, VIDRA 2-D and VIDRA 3-D program packages can be expected in 1987. The VDN 52514 intelligent, high performance, monochrome, point graphics video terminal is compatible "from above" with the DEC VT-240 equipment. It can be used effectively as a graphics workstation in VT, TPA, SZM-4, SZM-53 and PDP systems.

The PHAROS intelligent, graphics GKS workstation of MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences] has a black-white or color monitor and can be used well in CAD/CAM/CAE, architectural and business graphics applications. An accessory to PHAROS is the first domestically developed mouse. It is capable of storing and handling a maximum of 1,000 graphics segments simultaneously.

The Graphisoft Gmk [economic work association] has won an international reputation with its ArchiCAD 3-D architectural designing system which can now be run on IBM PC/XT or /AT machines and on the Apple MacIntosh PC. The configuration on the IBM PC's is: 640 K bytes, MS-DOS 3.0, arithmetic processor, serial interface, special graphics control card, graphics digitizing table or mouse, a good quality plotter and a matrix printer. The guide price for the software is 400,000 forints.

IBM showed a microcomputer based graphics workstation at its own stand (the 3270-PC/GX, which includes a large color display, a digitizing table, mouse and optional A/1 size color plotter) and Siemens did so (the 9731-4) at the SZAMALK stand. This indicates that great emphasis has been given recently at these two firms also to CAD/CAM and other applications areas requiring graphics handling.

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SOFTWARE SEEN AT BUDAPEST FAIR

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 2

[Article by Tamas Szekely: "Applications Software--Waiting for a Qualitative Leap"]

[Text] The applications software offering of the BNV [Budapest International Fair] corresponded to the average applications needs. It appears that a uniform market supply has developed and that at last the various computers are being offered suitable software for purposes corresponding to their category.

The basic assortment appears to be uniform for all vendors. Everywhere we find text editors, database managers (for networks too), IBM and DEC terminal emulators and a rich variety of programming languages. The vendors of applications software products evaluate positively the effect of the widely used, justly popular Western programs (Lotus 1-2-3, dBase II, Multiplan, etc.) because these aid in overcoming the well known psychological limitations and thus may increase user demand for professional applications.

Both the large enterprises and the smaller firms are offering data processing programs which, due to mass demand, now count as virtually the basic assortment. These are wage, labor affairs, inventory management, fixed assets, general ledger, etc. systems or specific versions of them, for example for the milk industry or agriculture. It is an unfortunate fact, and the developers often underline this also, that enterprise applications needs do not go beyond putting work on the computer manually, although there is already a supply on the market of more demanding data processing systems. For larger machines (TPA, MSZR, etc.) one can obtain such systems as the well known MAS-M (SZAMALK [Computer Technology Applications Enterprise]) or the RAKTER system of Videoton for the VT-600 and VT-32 (this embraces fewer areas than MAS-M).

In the PC category both the larger enterprises (SZKI [Hungarian Computer Research and Development Center], SZUV [Computer Technology and Management Organization Enterprise], Videoton, etc.) and the smaller ones (Econorg, Novotrade, System, Softinvest, etc.) are offering quality products and services which are already indispensable in definite, narrower areas. One could sense for virtually all the exhibitors a market orientation and the fact that they have a most high quality and operational background capacity.

One finds in the offering, in addition to business-economic data processing which still represents the larger part, an increasing number of solutions developed for measurement data collection, process control, graphics supported CAD and integrated office information systems. It is rather difficult to orient oneself in all this, and selecting the most advantageous solution is even more difficult--for the non-professional computer user. It would help a great deal if some organization suitable for it (well prepared and objective), such as the KSH [Central Statistics Office] or one of its organs, the NJSZT [Janos Neumann Computer Science Society] or some other well prepared organization would evaluate and classify these products and thus provide orientation for potential users.

An initiative by Scitel and Novotrade may be moving in this direction. With the aid of teledata terminals in the shop networks of the latter and of Centrum they are moving toward realization of a national software trade information service. The terminals, using an Orion VTX-960 Prestel adapter, operate in an online link with a large computer or in the offline mode, connected to Proper-16 computers.

It is unfortunate that user needs have not grown even in the non-traditional areas (e.g., science and engineering) up to the level which can be regarded as minimal today. There are obviously economic reasons for this. In many cases they automate only those tasks which cannot be performed without a computer. Despite this many domestic exhibitors at the BNV (the KFKI [Central Physics Research Institute], MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences], the SZKI, Videoton, SZAMALK, etc.) appeared with CAD applications, graphics workstations, etc.

As a whole one got the impression that in the area of applications software the limitations are represented by user needs. There are several reasons for this situation:

--the relatively high price of computers;

--the economic environment, which does not make precise planning possible and does not demand quality economic analysis; and

--the fact that the use of computer technology has not yet taken on such a scale as to develop a homogeneous computer technology environment permeating the national economy which would force economic units at various levels to develop their own computer technology infrastructure.

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BUDAPEST FAIR REFLECTS LATEST MICROCOMPUTER PRODUCTS

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 3

[Article by Csaba Gergely: "Microcomputer Technology"]

[Text] The Cosy-Primo, the TV-Computer of Videoton and the HTSZ [Communications Engineering Cooperative] school computers dominated this year among the school and hobby computers making up the lower category of microcomputers. The simplest Primo--with contact keyboard and 9 K bytes of user memory--costs 9,000 forints. In connection with the TV-Computer we noted even last year what, according to reports, is now being realized--manufacture in series of several thousand and department store sales (the price of the basic unit is now 13,900 forints). The HT-2080Z, with an expanded peripheral assortment (printer and floppy disk unit), 64 K bytes of memory and a graphics version expandable to 512 x 512 pixels, and the HT-3080C, which can operate in a CP/M operating system using the entire 64 K bytes of memory, were made as school computers.

In our report on last year's fair we noted that PC/XT and MS-DOS compatible products were coming into the foreground in the domestic assortment of PC's, forcing out the 8 bit technology. Well, this year the former made up the main body of products exhibited, supplemented by AT compatible models with greater processor capacity. IBM itself made expanded capacity models, compared to earlier, available for sale in Hungary (the XT with a 20 M byte Winchester and the AT with 2 M bytes of main memory). The other well known computer firms included HP, Sperry, Siemens, Rair, Apricot, Victor, Data General and Tandon whose names could be read on the machines and we even saw Sanyo and Casio products. Models manufactured by domestic firms or sold with more or less added value included the VT-16, Proper-16, Varyter, MXT, 420-XT, Alfa-Micro, and Controll MC 86 as the best known, most of them from last year. But there were a few new items. The SZKI [Hungarian Computer Research and Development Center] introduced a PROLOG supplement for the Proper-16. Thanks to a combined hardware-software solution PROLOG programs can be run twice as fast and with a relatively small investment a user can get an artificial intelligence workstation--though one with relatively modest capacity. Videoton introduced the VT-16 in a four workstation version as a group data collection system (PROCENT). The picture screen workstations (VSD or VDX) can be connected via a 4 or 8 channel Z80 based multiplexer to a base machine equipped with

Winchester and floppy disk. (For performance reasons it is not useful to have more than four workstations.)

One year ago a user had to dig quite deep into his pocket to get an XT. What cost about one million forints then (a 256 K byte base machine, floppy disk unit, 20 M byte Winchester, color monitor) can be obtained now for 420,000-450,000 forints. The price of the same machine in the offerings of Western firms is about 4,000 dollars, which means that the relative quantitative purchasing power of the forint-dollar is about 110-1. We have seen worse, but we believe that this ratio could be a good bit more favorable if more efficient use of the available resources and of developmental/manufacturing capacity had greater weight among the factors and interest relationships influencing the domestic price level.

This year, even in the offerings of domestic firms, a number of PC/AT compatible solutions are available for those for whom the processor capacity of the PC/XT is not enough. These include the Proper-16MT, the Varyter-AT, the Instrument Technology MAT, the PC 620AT sold by Microsystems, the Micro-Controll 87 and the RAAB 86/AT. Performance about three times greater costs about twice as much (with similar memory capacity); that is, the development of the performance/price relationships can be characterized approximately by saying that this year one can get a PC/AT at the PC/XT price level of last year.

The striving for multiple workstation configurations is a unique and rather contradictory phenomenon in microcomputer technology. The contradiction is between the individual use of personal computers, by their nature, and the striving for ever higher exploitation of capacity or machine time. For the IBM compatible PC's there are various solutions in the MS-DOS environment; we saw examples of software controlled resource distribution and software solutions combined with supplementary hardware resources (e.g., I/O processor or a supplementary processing processor built in at each workstation). The other fundamental software environment is the UNIX/XENIX time-sharing operating system which offers a solution, used on AT compatible machines, for multi-user, multi-task machine use. We do run into limits, sooner with the software solutions and somewhat later with the combined solutions, so the upper limit for the number of workstations is 3-5.

An interesting solution, deviating from the above, is represented by Eaststar, part of the noteworthily broad assortment of Instrument Technology; this modular multiprocessor system building in Intel 8088 or 80286 operation performing processors combining the performance of several PC/XT's and/or AT's serves a maximum of 16 terminals. So in its technology it is a microcomputer but in its services it is a minicomputer which can also be linked into a local network (MT-NET). Its operating system is Concurrent DOS.

The supermicros, minicomputer architectures realized with micro technology, represent the units with the greatest "firepower" in the microcomputer technology fleet.

From the assortment already known last year we again saw the SZTAKI supermicro and the VT-32 and a new item appeared in the Instrument Technology TM 16/32.

All three are based on the IEEE-VME bus; the first one uses a Z 8001 (16 bit) processor and the latter two use a Motorola 68000 (16/32 bit) processor as the main processing resource. One might also mention here the Rair supermicro (I80286 processor) offered for domestic sale in a cooperative venture by the 5G Small Cooperative and the APEG engineering office in the FRG.

One characteristic operating mode of the supermicros is multi-user, multi-tasking operation, which runs into limits in the PC/XT and PC/AT categories. For this purpose the TM 16/32 has two operating systems, the OS-9 similar to UNIX and the de facto standard UNIX-V; both support eight terminal workstations on the given hardware.

The processing capacity of the supermicros and the supplementary resources which can be attached flexibly to the base bus system (e.g., a graphics auxiliary processor which performs the fast vector computing operations needed to address typically 1024 x 1024 pixels) make it possible to service graphics tasks also. So one could see the VT-32 in a graphics workstation (CAD workstation) configuration, just like the SZTAKI supermicro. In applications programs, in both systems, the GKS (graphic kernel system) coupled to the basic operating system makes possible the programming of graphic I/O operations independent of the physical properties of the peripheral devices.

The KFKI [Central Physics Research Institute] designed its TPA-11/170 microcomputer entirely for office and business applications. The highly integrated processor chip used makes possible high operating speed with small dimensions and great reliability, providing compatibility with the DOS-RV Plus operating system. Its performance/size ratio is one of the most favorable on the domestic market.

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# NEW PERIPHERALS AT BUDAPEST FAIR

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 4

[Text] It is gratifying that to an ever greater extent the various domestically developed systems are being equipped with small printers manufactured by Datacoop, Terta, the SZKI [Hungarian Computer Research and Development Center] and Videoton. But it is unfortunate that while micro and minicomputers with ever greater capacity processors are appearing these machines are, in general, supplied with backgrounds a good bit less modern than their central units. There continues to be no domestic or socialist supply of large capacity, high reliability, fast operating magnetic disk and magnetic tape drives or streamers, and the exhibitors from capitalist countries "forgot" to bring such things to the fair. The selection of floppy disk drives is expanding, but one must wait until the beginning of next year for the first Hungarian Winchester disk device. Among the foreigners one can mention the appearance of some world famous Japanese manufacturers of printers and the fact that one could see laser (Laserjet) and ink jet (Inkjet) printers and plotters of the Hewlett-Packard firm and digitizers and plotter designs traded as finished products by a few domestic manufacturers.

A prototype series of the 10 M byte version of the MW-1000 5.25 inch Winchester store is being manufactured as a stressed developmental theme by the MOM [Hungarian Optical Works], and the beginning of zero series manufacture can be expected in 1986, but it will be next year before it will be sold as a product which can be ordered on a continuing basis. Devices will be handed over this year to the largest domestic users partly to solve interfacing problems and partly for quality tests. They have also begun development of a larger capacity Winchester drive. The MOM manufactures and sells the control system for MFW-5 and MFW-8 floppy and Winchester drives developed by the Creative Youth Association. This can be a fast solution primarily for those customers who are now developing systems, PC's, with an SCSI (ASAI) interface. At the fair they showed an example of the prototype series of the new MF 6400 DSL half-height, 1.6 M byte capacity, 8 inch, double side, double density floppy disk drive unit. A new product is the MF 2000 increased reliability, 40 band mini-floppy disk store. According to reports development of a double side, 1 M byte, half height, 5.25 inch floppy disk drive unit has begun at the MOM also. According to the plans they will manufacture more than 30,000 of the well known MF 6400 devices this year.

At the KFKI [Central Physics Research Institute] stand we saw the MSX 1/2 inch magnetic tape unit operating in an 11/170 configuration. At the time Orion took over for manufacture the design developed by the KFKI. Then nothing happened for years, but now it is reported that manufacture will begin soon in the Industrial Instruments Factory in Iklad.

A page reading device displayed by the SZKI is a new type of information input device based on form recognition software achievements. It makes possible the interpretation of typed texts, putting them into the computer. The MOM also participated (image digitization mechanics and optics) in development of the device which operates on the principle of character recognition (OCR). The desktop peripheral moves the paper and reads in the contents of an A/4 page in about one minute. It will probably appear as a finished product in the third quarter of 1986.

We saw the CM 6314 laser page printer as an output device for a VT-32 based graphics workstation; its two chief structural units are an He-He gas laser and a Xerox type copying machine. We were unable to learn the origin of the latter; the information provided was most "reserved" in any case. We did learn that its output is ten A/4 pages per minute with a resolution of 0.1 mm x 0.1 mm. At present it works with a video signal input, later it will be equipped with a serial (RS 232) and parallel (Centronics) interface and several types of character generators; series manufacture can be expected beginning in 1988.

Appearing for the first time at the fair was the Japanese firm selling the most matrix printers in the world, Epson, which wants to increase its sales in Eastern European countries to a great degree. It will develop a market network in our country first. According to its experts about 2,000 of its printers are operating in Hungary already and this number increases by about 150-200 each month. They consider it necessary to organize representation in Hungary and are seeking a partner to provide service; they will soon set up a transit warehouse here also. In addition to the well known LX-80, FX-85 and FX-105 printers they exhibited a more developed 24 pin device producing letter quality print and capable of italic and proportional printing also.

The new Soviet ESZ 7038 line printer can be used in ESZR [Uniform Computer Technology System] series I and II systems which have OS 6.1 (or higher) operating systems. Its maximum speed is 700 lines per minute and it prints a maximum of 132 characters per line.

The graphics applications discussed elsewhere in our compilation naturally presume the existence of suitable displays. High resolution graphics screen monitors figure in the programs of a number of our firms (SZTAKI, KFKI, Instrument Technology, Orion, the Point Small Cooperative, HTSZ [Communications Engineering Cooperative], SZKI) and the development of a color graphics display is under way at Videoton also, one which can be included in the graphics workstation configuration of the VT-32.

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# INSTRUMENT INDUSTRY, PROCESS CONTROL DEVICES AT BUDAPEST FAIR

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 4

[Article by Dr Huba Bruckner: "Instrument Industry, Process Control"]

[Text] Development exceeding the domestic average characterizes the instrument industry, which provides 8-9 percent of domestic machine industry production. About 40 percent of the instruments exhibited at the fair are new products. Sixty percent of the instrument industry production is sold abroad. Our report can describe only selected bits of the new items.

It is to the credit of the integrated systems attitude of the Laboratory Instrument Industry Works (Labor MIM) that it also offers a professional personal computer, the Labsys 80, for its instruments which can be connected with a computer; with it they deliver an MP/M multiple terminal system with CP/M 2.2 or operating systems compatible with the CP/NET network control. The data collection and processing systems can accept analog and digital input signals (e.g., measurement data from instruments). One can also connect to these computers the Infrapid fast, reliable and multipurpose analyzer which works with infrared rays without chemicals. Evaluation of the measurements which can be done at 1,100 wave lengths can be done by computer, although the device's own printer also displays the measurement results coming from the instrument.

An entirely different product of the Labor MIM is the Optimatic electric power use optimizing system which performs its task by knowing the consumption data and regularly querying the network parameters. The energy conservation aspirations figuring in the goals of the 5-year plan only increase the national economic significance of the energy management guidance system. The system, which accepts and records 56 input signals per minute, produces intervention signals on 16 parallel output channels.

MIM-EL--the electronics subsidiary of the Instrument Industry Works--exhibited a multi-user computer system with a Z 8000 processor and multibus which is used, for example, at the Paks Nuclear Power Plant. (The system really satisfies "live" user needs, to such an extent that at the time of the BNV [Budapest International Fair] they shipped some elements of it from the exhibit pavilion to the user site.)

A 16 M byte storage capacity can be added to the central unit, controlled by a Z 8001 microprocessor; there is also error correction (correction of one error, recognition of two) on the 0.5 M byte memory cards. A technological control keyboard was developed especially for concrete applications; the quasi-graphic display makes possible eight color display of 256 programmable characters on a color monitor driven through an RGB input. Since the product of MIM-EL communicates with the SZM-2 process control computer of the reactor they also took care of suitable special interfaces between the systems.

The Instrument Industry Cooperative developed its programmable relay testing equipment for its own purposes because fast and precise manual testing of the several million relays made each year is unimaginable. The automatic device, which measures six electric and mechanical parameters, also prepares a computer protocol. International interest in the device is shown by the fact that the cooperative prepared a similar automatic testing system for the Siemens firm, among others.

The precise determination of the failure site in telephone cables is aided by a contact alarm system which also gives an immediate alarm in the event of a failure in the coating of the cable. Knowing the unfortunately frequent failure of domestic telephone cables we might justly hope that the Post Office will soon make use of this system.

The pride of the EMG--the Electronic Measuring Devices Factory--is the 19400 computer controlled automatic measuring device, which also won a grand prize at the fair. The device can perform in-circuit and limited functional tests. In the course of the in-circuit measurements it tests for breaks or short circuits in printed circuits and for the correct seating of the discrete elements (resistors, condensers, coils, diodes, transistors) and measures their parameters and checks the correct seating of analog integrated circuits and the setting of potentiometers, without turning on the power. The functional tests are made on a card with power. The system stores the functional characteristics of a number of integrated circuits. The number of test points--these are the contacts flexibly connected to the printed circuit--can be 1,024 in a suitable structure. A number of instruments can be connected to the automatic testing device, which is built with an Elektronika 60M? computer, through an IEC 625 bus; these instruments perform the functinal tests of the circuits.

A number of data transmission instruments of the Electronics Cooperative are also made with microprocessor control; these include the PCM error rate meter (EBH-30/120), the transmission technology test site (ET-110) and the signal generator and error detector (EHB-480).

We saw a large M80 microcomputer process control system at the MIKI [Instrument Industry Research Institute] Measurement Technology Developmental Enterprise which is used, for example, for computerized operational control of a regional water supply system. The system, using an M80 microcomputer, can be expanded continuously by modules--just like other similar process control systems. MIKI offers a very broad assortment of modules.

The COSY [Cooperative Systems, a subsidiary of MTA SZTAKI, the Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences] displayed, as vendor, the LAOCON-GAMT process control system for control of plastic injection molding machines. This is intended primarily for so-called supplementary automation. The first use of the system was at the Hungaria Synthetics Processing Enterprise but there is serious interest in its use on the part of Soviet, Czech and GDR synthetics processing factories. In its present version the control system can store technological data on 100 different products and it can be updated on the basis of an identification signal. The LAOCON, developed by MTA SZTAKI, is a distributed, programmable control system; it tolerates an industrial environment well, is reliable and can be flexibly adapted to the given requirements.

Using modules of the TR-80 microcomputer system the process control faculty of the BME [Budapest Technical University] has developed elements of the PRODALOG programmable measurement data collection and processing family. The elements of the family can be used in testing laboratories to solve data collection and processing tasks for industrial and agricultural slow technology processes.

The Telemetrikus microprocessor data collector can be used in fixed location and mobile (battery powered) operation. It performs sampling of 16 analog and two 8 bit digital channels and does serial conversion of the data measured. In mobile operation the serial, TTL level, Manchester coded output signal can be linked directly, with the aid of a PCM radio transmitter-receiver pair made by the BME Radio Club, to the MOD-81 modular computer of the BME Instrument and Measurement Technology Faculty (the computer is manufactured by the Medicor Works) and if desired it can be connected to any microcomputer. The A/D transformation time of the data collector is 20 microseconds, conversion is 8 bit, and the highest sampling speed (in one channel operation) is about 500 samples per second. The maximum data transmission speed of the PCM radio link is about 100 K bits per second.

With the aid of the Uniport universal signal and data management system made at the BME it becomes possible to use a C-64 microcomputer for direct observation of physical, chemical, medical, etc. processes; they can be controlled, the measurement signals of instruments can be sampled and the data collected. The hardware configuration of Uniport is operated by one BASIC and one machine code system program. The machine code programs ensure fast operation; users versed in programming can use these independently as subroutines also.

The UNILIFT microprocessor elevator control equipment developed and patented by the Mihaly Pollack Technical College and the Electric Industry and Machine Repair Cooperative in Pecs is suitable for direct selection of any domestic and import relay control. The possible failure of the microprocessor unit in the Z 80 based microprocessor control and monitoring system does not endanger the safety of the elevator. The minimized input and output lines are shortcircuit protected from environmental disturbances and are optically isolated.

The Communications Engineering Cooperative, which always appears with new products, reported a really new item. Its "Cordon" security and industrial

television system is suitable, for example, for covering protection of computer centers but it can also be used to monitor and control industrial processes. The really interesting feature of the system is the single line video remote control system. The essence of this is that while earlier multiple line control and video cables were necessary to link and control the elements of the system a single coaxial cable is sufficient in the case of the Cordon to transmit video signals and control signals. The control signals can flow in two directions (from the camera or toward the camera). The well designed cameras can work under very harsh conditions; their insulation and remote control make this possible in a reliable way. Thanks to a heating element in the camera housing the camera can even operate at an environmental temperature of minus 40 degrees Celsius. With a personal computer control system the various parameters of the cameras (such as output signal level, black level, etc.) can be remote controlled. The single line remote control is suitable not only for control of industrial television networks but can also be used, while transmitting the video signal, to maintain computer-computer or computer-peripheral links or to develop a video telephone system. The data transmission speed is 12,800 bits per second while transmitting the video signal. The single line system is controlled by the HTM 0005 integrated circuit of the Communications Engineering Cooperative on both the transmitter and receiver side.

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ROBOTS AT BUDAPEST FAIR

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 5

[Article by Dr Jozsef Marton: "Robots"]

[Text] Not even on this occasion did the foreign firms choose the BNV [Budapest International Fair] to introduce their newest models. In addition to the Kloss firm, the West German DETE also showed a version of a painting robot developed from a model of the Jungheinrich firm. For the first time in Hungary we could see the small desk robot of the Japanese firm Mitsubishi at the stand of the firm manufacturing EMCO CNC controlled training machine tools. The robot was serving a training lathe and a processing center on one table in a configuration modeling a flexible manufacturing system. The Marton Air firm's appearance represented something new; their pneumatically driven robots were built into an assembly system by the Bakony Works. It is expected that this relationship will continue and that cooperation based on a commodity exchange with the Hungarian enterprise will be organized with the West German firm, thus expanding the flexibility of their assembly systems. Among the Hungarian enterprises the Rekard Gyor Agricultural Machine Manufacturing Enterprise again showed its welding robot made on the basis of a license purchased from the Austrian IGM--showed it in operation. The unfortunate fact that they have not succeeded in producing a Hungarian version of the control, so that the import content of the equipment now approaches 30 percent, is still an obstacle to broader sales. Even so the factory may be able to manufacture the equipment in small numbers for Hungarian users since a commodity exchange plays a role in this relationship also. The factory would produce and deliver to the seller of the license as many products as would be needed to purchase the imported units, if the handling of the administration were not so difficult.

We also met with the Rekard name at the exhibit of the Machine Tool Factory of the Csepel Works where their portal robot and pallet handling equipment served a lathe of the Csepel factory. An interesting feature of the configuration was that on the upper rail one could see not only the customary two parts exchanging arms but also a third arm for automatic tool exchange. An electric servo motor is used for horizontal movement on this robot but they are still using hydraulic cylinders for vertical movement. The factory has also prepared a newer robot in which they use electric servo motors for both movement directions. They had intended to exhibit this new version and the reason it

did not reach the BNV was again the controls, because they do not have lathe control equipment which is suitable for simultaneous control of two times two axes. They trust that the EMG [Electronic Measuring Devices Factory] will soon solve the problem and then they will be able to substantially increase service speed compared to what could be seen at the fair.

At the stand of the Custom Machine Factory of the Csepel Works we could see model HD 200 of the heavy industrial robot already exhibited last year. One could see substantial progress compared to last year in that then the robot arm manufactured here at home was supplemented by controls and hydraulic feed unit from the Japanese firm selling the license, DAIDO, but now the controls come from Vilati and the hydraulic feed unit from Danuvia. The domestication of the most essential elements of the equipment still awaits the domestic production and availability of the servo valves.

The appearance of the technical development small cooperative called Mechatronika was a new spot of color at the exhibit. We could find their products at two places, a programmable servo control which can be used to control the direct current servo motors for the articulated movement of robots, robot arms and similar devices. Using this they have built a robot type packing device to move and reload flat glass sheet and, in cooperation with MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences], they have solved control of a Unimate PUMA robot arm without using the original controls. The PUMA robot was exhibited at the Rekard stand with this servo control and SZTAKI built the control equipment into the hardware of a vision module. The essence of this is that in addition to the vision function it is also capable of controlling the robot with the intervention of the servo controls mentioned earlier. This solution can be used only if the program has been already prepared somewhere and if it has been read in in the proper form into the control equipment combined with the vision module. Separate equipment is needed for programming. As the people from SZTAKI said, they have solved the software problems for this task and the robot can be programmed with the aid of an IBM PC; they are now waiting for a Hungarian enterprise to undertake development of the hardware.

Two training robots which could be seen at the stand of LABOR MIM were new spots of color at the exhibit. Both are electrically driven, one in a cylindrical coordinate arrangement and the other in an articulated coordinate, or so-called humanoid version. For the time being these robots can be regarded as mock-ups or perhaps prototypes. We can hope that next year we will meet with industrial versions of them and we can trust that they will be manufactured for schools at an accessible price.

We might include in the robot technology theme area the six component force and pressure sensor exhibited by the Kaliber Instrument and Measurement Technology Enterprise. The sensor is made in two measurement range versions, 0.5 kN and 20 and 10 Nm. The sensor--as we have reported--has already been tested in Finland in the NOKIA robots. The next task is further development of signal processing and fitting it to optional robot controls. We met with the PUMA robot arm in another place too, at the exhibit of the Microelectronics Enterprise (MEV). The interesting feature of this was that the robot arm resembled its original version only externally because it was built in its

entirety out of Hungarian parts, most of which had been made in the Gyongyos factory of the MEV. We cannot say entirely the same of the controls because here one still finds a more substantial portion of import, although this control was designed for the Soviet made Elektronika-60 microcomputer. We await with interest in what form we may see a version regarded as a prototype at the next fair, and of no less interest is under what conditions Hungarian purchasers may obtain them.

To sum up we can say that the development of robot types already known from earlier exhibits, and getting them into production, is continuing, if not without hitches, and one can expect that in the course of the year users will be able to purchase robots with Hungarian servo controls.

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## VARIOUS SPREADSHEET PROGRAMS COMPARED

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 6

[Article by A. K.: "What Are Those CALC's? Characteristics of Spreadsheet Programs"]

[Text] Every day thousands of tables containing interdependent data are prepared which must be computed according to some algorithm and then the results of the computation must be written back into the same table. The results are either final results or new computations must be done with them. The spreadsheet programs which have appeared in large numbers on international computer markets in recent years, most recently in our country, are especially suitable for carrying out tasks where the data must be stored in tabular form, where there are constant interdependencies among the data requiring repeated calculations, and, in addition to the frequently changing requirements, the table must always be up to date.

These programs work with extraordinary speed. With their aid any of the values in the table can be changed easily, as a result of which changes take place at other points in the table almost immediately. These programs can be used best in financial planning, accounting reports, bookkeeping, inventory management, etc., in every other area of business life and even in housekeeping.

Spreadsheets have become popular on professional personal computers aiding such natural tasks primarily because of the need for frequent recalculation and the necessity of a dialog between the user and the program package.

### The Most Popular Foreign Programs

VisiCalc, which appeared in 1979, was the prototype of the so-called first generation spreadsheet programs, which are not connected with others. Multiplan (now Multiplan 2) sold by IBM is popular today also. Today the so-called integrated spreadsheets have taken the lead. Outstanding among these is 1-2-3 of the Lotus firm, but others are well known also, including Framework of the Ashton-Tate firm, Symphony, the newer development of Lotus, and the Open Access product of the SPI firm. In addition to many common characteristics these have such different services as will better approximate the needs of users.

Although first generation spreadsheets are still characteristic in the domestic offering it is to be expected that more developed integrated program packages will appear in the near future. It would be useful if future users had a clear picture of the chief characteristics and those extra services which some program packages offer.

What Should We Look For?

1. The maximum size of the table (lines x columns, the maximum number of fields),

2. The maximum number of significant digits the program computes,

3. Can one refer to a field with a name given by the user,

4. Does the program contain a prefabricated table model or must parameters be entered separately for individual (e.g., financial) applications,

5. Can the program draw pie charts and histograms,

6. Can the user define macros to store his frequently used formulas and instruction sequences so that they need be keyed in only once,

7. The number of windows which can be displayed by the program,

8. Can the program handle several work sheets at once, permitting the user to take a field out of each; can the program combine the work sheets with one another,

9. Is it possible to transfer data between the spreadsheet and other programs.

One should expect from the documentation that every program package will contain brief, simple instructional material, an index showing all the characteristics of the program package, an abbreviated description beside the use instructions and a richly illustrated collection of examples.

Calqla and Intercalc

We have shown in tabular form the chief characteristics of two domestically sold spreadsheet programs, giving the corresponding parameters of the Multiplan and VisiCalc programs for purposes of comparison.

Intercalc works on the following computers: ESZR (1035, 1045, 1055), MSZR (SZM-4, SZM-1420), the TPA-11 family, IBM PC and compatible personal computers, PDP-11, and Siemens. It is worthy of note that of the spreadsheets known only Intercalc works on MSZR and ESZR computers too. According to the developers it is a useful service for users of a multi-terminal large computer if a spreadsheet program is available in their accustomed environment. Sale of the product began in the second quarter of this year.

The Calqla program is a version of the VisiCalc program family prepared for the Commodore-64 computer. Sale of it began in 1985. The "work sheet" can be

64 x 64, 32 x 128 or 16 x 256. Data (numeric, text) or formulas can be entered in each of the fields of the matrix with a maximum of 4,096 positions.

Data pertaining to the two domestic products come from the vendors.

| Characteristic | Intercalc | Calqla | Multiplan | VisiCalc |
|---|---|---|---|---|
| Vendor | SZAMALK | SZAMALK and its agents | IBM (1) | VisiCorp (1) |
| Operating system | OS/VSI TSO<br>RSX-11<br>BS2000<br>MS-DOS | -- | PC-DOS | PC-DOS |
| Min. memory (K bytes) | 128<br>300 (TSO) | 64 | 128 | 64 |
| Max. size (line x column) | 255x63 (ESZR)<br>254x64 | 254x16 (a)<br>128x16 (b) | 255x63 | 254x64 |
| Number of sig. digits (max.) | 7 (TSO)<br>15 (Siemens)<br>9 | 7 (a)<br>13 (b) | 14 | 12 |
| Field call by name | no | no | yes | no |
| Menu/command cont. | yes/yes | yes/yes | yes/yes | yes/no |
| Column width (min-max char.) | 6-76 | 3-17 | 3-32 | no data |
| Different size col. | no | yes | yes | no |
| Two or more models can be combined | yes | no | yes | no |
| Graphics | no | yes | no data | no |
| Price (thousand forints) | 35 (IBM comp)<br>50 (MSZR)<br>100 (ESZR) | 23.1 | 245 GBP | no data |

(1) Not sold in Hungary.
(a) N-Calqla.
(b) P-Calqla.

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EAST EUROPE/COMPUTERS

## KFKI VERONA PROGRAM AT PAKS

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 7

[Text] The first 440 MW unit of the Paks nuclear power plant was put into operation in 1982, the second in 1984. Both have functioned perfectly since. Contributing to this, among other things, was the computer system which handles the thousands of data arriving from the reactor to the reactor control room and presents them in an easily reviewable form. The Central Physics Research Institute (KFKI) developed this computer system, Verona.

Two to three thousand data elements are continuously flowing from the reactor to the control room. These are received, analyzed, summed up and displayed by a computerized data collection and display system, Verona. The program itself runs on a TPA-1148 computer to which are connected four disk stores, two each black and white and color picture screen displays and a printer. Verona displays the most important measurement data on a color screen, arranged into ten diagrams. In addition it arranges data which belong together in a journal form and the pages of this can be displayed on the screen or printed out. The system handles the data in a flexible way. Among other things it checks to see if they are credible. For example, it compares data arriving from the same points in the reactor with one another and with the measurement error limits and throws out values smaller or greater than the average.

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## ES 1055 AT UNIVERSITY IN DEBRECEN

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 9

[Article by Dr Pal Jekel: "ESZ 1055M in Debrecen"]

[Text] Computer technology instruction has been taking place at the Lajos Kossuth Science University since 1964. About the same time the several faculties began to use computers in research. But these first steps were linked not to its own computer but to computers operating in the capital. The first computer received in 1967--despite its capacity, which would cause smiles today--gave a great impetus to computer use at the university and in the environs. In addition to the faculties of the university a number of Debrecen factories presented their computer needs connected with their technical-scientific tasks.

The initial period was characterized by both spectacular achievements and disheartening failures. But it soon became obvious that it was not useful simply to transfer former methods onto a computer. Appropriate methodological research and the development and adaptation of programs began.

Within a very short time computer technology became an everyday tool of university research. More and more demands appeared very quickly and even the computers put into operation later could satisfy them only in part. One of these demands was that the users--on the basis of foreign experience--should get closer to the computer, partly so that the measurements and the evaluation of them should not be separated in time and partly so that they could immediately check their program development ideas. The ESZ 1055M computer handed over in 1986 makes this possible.

At present the system accepts 32 near terminals through an ESZ 7922.01 control. Of these, eight ESZ 7927.01 terminals are in a central terminal area, the others are located in various units of the university.

An ESZ 8404M1 multiplexor receives the data of remote terminals; it has ten V24 lines and six IFSS lines in the present configuration. At present we have five direct and one connected postal lines which link the Debrecen and Nyiregyhaz institutions of higher learning.

The parameters of our new machine are substantially better than the parameters of the ESZ 1030 computer used earlier, for 10 years. The total disk capacity is 30 times and the speed of the central unit of the machine is about six times greater. The applications and system software delivered with the computer is quite varied. It is possible to operate several virtual computers at one time and different operating systems (OS, DOS, etc.) can run in them independent of one another.

In instruction these possibilities mean that in the course of their studies the graduating students become acquainted with modern methods which they can use directly in their future jobs.

These possibilities mean a great qualitative change at the Lajos Kossuth Science University and in its area of attraction. One can realize complex business mechanization which was not entirely possible before. In the area of scientific computations the increased machine speed and virtual memory management make possible studies of larger models than before for quantum chemistry and quantum pharmacology problems. The computerized linguistic research and text processing work done for two decades, partly with international cooperation, can continue under qualitatively better conditions.

The varied applications software not only makes possible a continuation of the former research themes (immunogenetics, medical biology, computer graphics, complex chemistry) but also offers a way to bring new areas into the sphere of applications with new tools.

It also becomes possible to create databases, for example in regard to the University Library, operating as a national library, and in more efficient operation of various record keeping systems already begun in the area of health affairs.

The ESZ 1055M computer has expanded the educational base of the eastern Hungarian region and at the same time it plays an effective role in meeting a significant part of the scientific needs. But in addition it opens new prospects for other uses in the area. We await a link with technical and economic institutions which will find convenient opportunities for solving their tasks with an ample assortment of user software.

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EAST EUROPE/COMPUTERS

## CEMA PRODUCTS DISPLAYED AT LEIPZIG FAIR

Budapest SZAMITASTECHNIKA in Hungarian No 7, Jul 86 p 13

[Article by Joszip Rajman: "Leipzig '86; New Products From CEMA Countries"]

[Text] In a typical configuration the Soviet SZM-1210 minicomputer system, suitable for both local and remote processing, contains two processors which use the same 4 M byte memory. The average operations speed is 2.2 million per second. The first 32 bit minicomputer system of Czechoslovakia is the SZM-52/12 which can operate with magnetic disk units having a maximum total capacity of 800 M bytes. The ESZ 7140 desktop electrostatic line printer prints at a speed of 1,200 lines per minute; there can be 132 characters in one line. The new Bulgarian PC is the SUPER 11 which has a memory capacity of 256 K bytes (640 maximum). The machine, compatible with the IBM PC/XT, has one floppy disk and one 10 M byte Winchester disk unit. One can operate a maximum of 32 data input units in the ESZ 9005 16 bit data collection and processing system. There are two 29 M byte exchangeable disk units, a magnetic tape drive unit and a printer in the system, which has a memory capacity of 256 K bytes. The Mikronika P297 A/3 size plotter has a resolution of 0.1 millimeters and a maximum speed of 250 mm per second. The D297 digitizer is also A/3 size and has a resolution of 0.05 mm.

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EAST EUROPE/FACTORY AUTOMATION

# INTERACTIVE CAD/CAM SYSTEM FOR DESIGNING AXLES

Budapest MERES ES AUTOMATIKA in Hungarian No 4, 1986 pp 121-123

[Article by Gyula Pikler, of the Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences (MTA SZTAKI): "Interactive Designing System for Designing Disk Type Parts." The first paragraph is the Hungarian language summary.]

[Text] We developed an interactive CAD/CAM system for the design of disk type parts at the MTA SZTAKI in conjuction with the Mechanical Engineering School of the BME [Budapest Technical University]. The system makes possible the preparation of design and technological plans for axles. The interactive designing system consists of three parts: systems for design, preliminary product and manufacturing technology. All three parts of the whole system can also be used separately and each part is based on a common principle. The common principle is provided by the dialog system used in the system. In the article we briefly describe the dialog system and the geometric system and show the link between the three designing systems.

In conjunction with the Mecahnical Engineering School of the BME we developed at our institute an interactive CAD/CAM designing system for the design of disk type parts. The system makes it possible to perform design and technological planning of rotation symmetrical parts. The whole system consists of three parts and each part can be used separately as well. The three parts are:

--the design planning system,
--the preliminary product planning system, and
--the technological planning system.

All three parts of the system are based on a common principle. The dialog system used for system construction provides the common principle. The dialog system was developed at our institute and serves as a framework system for the whole designing system (1, 2); it ensures control and provides a process and method for the creation of interactive designing systems.

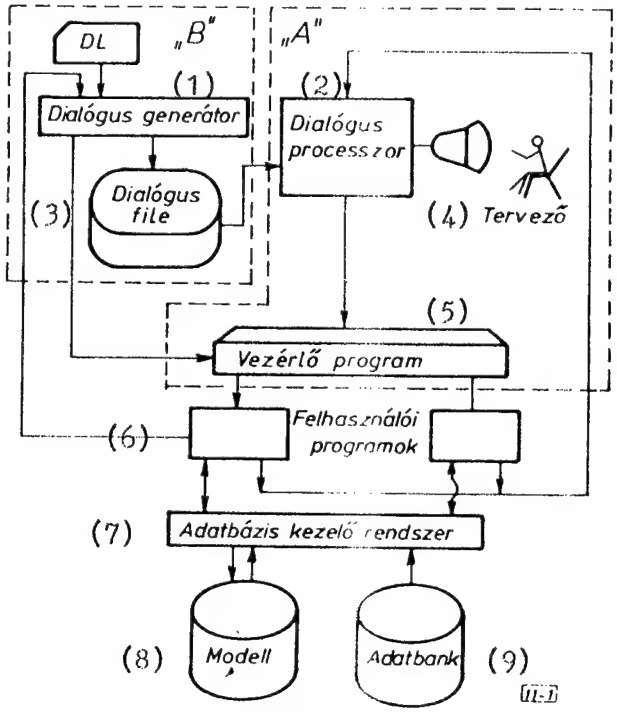
Designing rotation symmetrical parts (axles) also requires a well functioning interactive geometrical system. The interactive geometrical system developed at our institute (3) uses a model formulated with a database management

system. The model contains in structured form the geometric data for the structures consisting of the rotation symmetrical parts, for the parts, for the primitives making up the parts and for the drawings belonging to these. We formulated the structures of the model with the aid of a DDL language for a CODASYL type database (4).

In the following sections we provide an overview of the dialog system, the geometrical system and the whole designing system.

Structure of the Designing System Controlled by the Dialog System

Figure 1 shows the structure of the designing system controlled by the dialog system.




1. ábra

Figure 1.

Key:

1. Dialog generator
2. Dialog processor
3. Dialog file
4. Designer
5. Control program
6. User programs
7. Database management system
8. Model
9. Data bank

The functioning of the system is as follows. The dialog processor is in contact with the designer via the display. By using the peripherals of the display the designer provides the necessary information in the course of

planning, he provides data to the system (via the processor). At one time he provides only those data needed by one user program. After the data are provided the running of the program goes from the dialog processor to the user program via the control program. When the running of the user program is completed the running of the program again goes to the dialog processor. This cycle is repeated until the designing reaches an end. The dialog processor is controlled by data in the dialog file. It can be seen in Figure 1 that the dialog system consists of two parts. We have designated the first part "A" and it has:

--the dialog processor,
--the dialog file, and
--the control program.

The "A" part takes care of the functioning of the whole system, so it is the framework system of the whole designing system. The second part of the dialog system is the part designated "B" in Figure 1. This part makes possible the generation of the whole system. The "B" part consists of two parts

--the input program and
--the dialog generator

written in DL (Dialogue Language).

The user programs execute the activities taking place in the designing process which can be rendered as algorithms. The activities which can be rendered as algorithms and those which cannot replace one another during the designing process. A user program--which executes one or more activities which can be rendered as algorithms--is placed between two activities which cannot be rendered as algorithms. They cannot be in direct contact with one another, they can use each other's results only through the model or models in the way which can be seen in the figure. The models store the designing data in structures provided by the database management system (XDMS) (4).

Elements of the Dialog System

The dialog processor executes the dialog between the designer and the designing system on the basis of data placed in the dialog file. Its chief tasks are the following:

1. it sets the initial states belonging to the system;
2. it executes the part dialogs belonging to the dialog, that is
   --it writes out questions for the designer on the display and
   --it reads in the answers the designer has given to the questions;
3. after checking the parameters read in it puts them into a structure variable;
4. it produces the control parameters for the control program;
5. it writes out messages for the designer on the display; and
6. it determines the new part dialog on which the system must run.

The dialog processor is a generally formulated system since it solves general tasks. For this reason the dialog processor takes into consideration different

parameters and dialog data depending on the different designing systems. The dialog data are placed in the dialog file in a determined structured form. The dialog file must be loaded with data when creating a designing system. The dialog data do not change during use of the designing system because the dialog processor only reads them.

The control program is part of the dialog system. Its structure depends on the designing system, that is on the number of user programs and on the dialog data. The connection which exists between the part dialogs and the user programs makes it possible for the control program to be produced automatically.

The other part of the dialog system (designated "B" in Figure 1) loads the dialog file with data and produces the control program. Thus we call this part the dialog generator. Its chief tasks are the following:

1. it reads in and checks the instructions of the dialog program written in the dialog language (DL),
2. it organizes the data into structures determined from the parameters of the dialog program and places them into the dialog file, and
3. it creates, that is generates, the control program (in the "C" language).

We developed a so-called dialog language (DL=Dialogue Language) to describe the designing processes. A description of the designing process requires that we precisely define the events figuring in the process and the connections between the events. For this purpose we defined a graph structure which has special rules. This graph makes it possible for us to depict the designing processes. In the graph the nodes correspond to events and the arrows of the graph represent the connections between events. We defined four types of nodes to describe the designing process. These are:

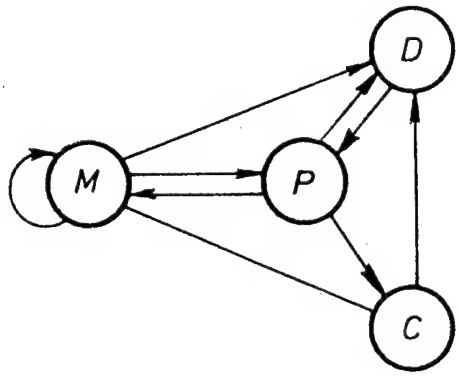
1. Menu type nodes (M). They can have any number of input and output arrows.
2. Question-answer type nodes (D). They can have any number of input arrows but only one output arrow.
3. User program nodes (P). They can have one input arrow and any number of output arrows.
4. Message type nodes (C). They can have only one input and only one output arrow.

The nodes of the graph can be connected to one another by the rules given. Figure 2 contains the rules.

The dialog language (DL) serves to describe the dialog graph. If we are to write a dialog program in the DL language we must precisely define the events figuring in the graph, that is the nodes. Different parameters belong to every node. For example, a menu type node has the following data or information:

--the number of menu elements,
--the content of the menu elements, which can be alphanumeric or graphic information,
--the position coordinates of the menu elements on the display,

--the dialog information assigned to the menu elements (program or part dialog name),
--etc.




2. ábra. 11-2

Figure 2.

The DL language also contains program technique instructions. Its syntax permits a free form, but it also contains definite (obligatory) rules.

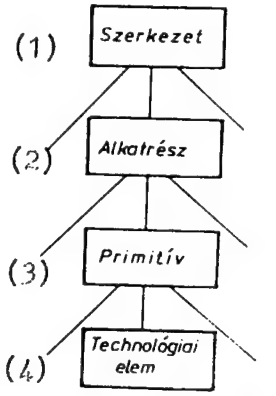
The Interactive Geometrical System for Designing Rotation Symmetrical Parts

The structure of the geometrical system is the same as the system structure appearing in Figure 1. A so-called geometrical model is part of the system. The model contains the data on the structures, parts and primitives making up the parts and the connections between them. We have formulated the hierarchical model with a structure describing language of a CODASYL type database. The primitives used in the model, the primitives used to describe the parts, are the following:

--cylinder,
--cone, and
--torus.

The so-called technological elements existing in the parts (recesses, notches, fillets, threading, etc.) are referred to the primitives. In the model we create the part by a logical combination of the primitives. A combination of the parts creates the structure. Figure 3 illustrates this connection system.

The model also contains a drafting model; we produce the content of this from the above geometrical model. A drawing on a plotter or on the display is done on the basis of the data put into the drafting model. Changes taking place in the interactive mode can take place at the levels of the hiearchic structure--or part.




3. ábra.

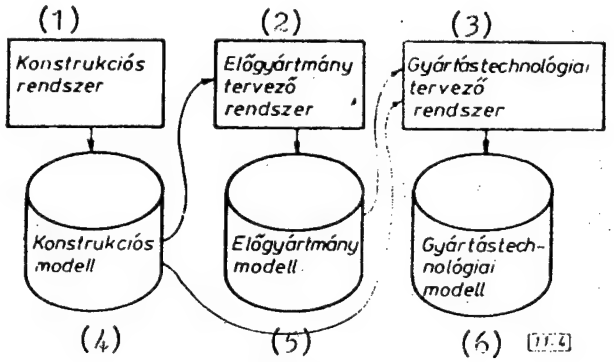
Figure 3.

Key:

1. Structure
2. Component
3. Primitive
4. Technological element

The Axle Designing System

The developed interactive axle designing system is a CAD/CAM system. The whole system consists of three parts. Figure 4 illustrates this.




4. ábra.

Figure 4.

Key:

1. Design system
2. Preliminary part planning system
3. Manufacturing technology planning system
4. Design model
5. Preliminary part model
6. Manufacturing technology model

First, with the aid of the design system, the designer prepares the design plans for the axle. In the course of the designing the geometric and

calculated data for the axle go into the design model. The geometric model contains the data for a drawing of the axle. The design model contains the input data for the preliminary part planning system. The output data of this system, that is the geometric data for the preliminary part, go into the preliminary part model. The content of the design model and of the preliminary part model constitute the input data for the technological planning system. The output of this system is a punch tape suitable for control of an NC machine tool. All three systems can be used together or separately.

We developed the axle designing system on the following hardware configuration:

--TPA 11/40 computer (256 K bytes),
--disk units,
--alphanumeric display,
--vector graphic display (GD'80),
--line printer.

We used a Unix operating system and prepared the programs in the "C" language.

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Biographic Note

Gyula Pikler is a mechanical and electrical engineer. He wrote his candidates dissertation on the theme of automation of mechanical designing processes. He has worked at the MTA SZTAKI since 1964. Here he first participated in research on hardware equipment. At the end of the 1960's and the beginning of the 1970's he dealt with automatic programming of NC machine tools. Since the mid-1970's he has been occupied with the automation of designing processes. The preparation of an interactive stamping tool designing system (ISTER) is associated with his name.

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EAST EUROPE/MICROELECTRONICS

## GDR FACTORY OFFICIAL ON DEVELOPMENT POLICY, ROLE OF FACTORIES

Budapest HETIVILAGGAZDASAG in Hungarian 2 Aug 86 pp 15-16

[Interview with Helmut Kappelhoff, director of the Stahnsdorf Microelectronics Factory, by Pal Reti: "Without Western Parts"]

[Text] The strategy for the development of the domestic electronics industry is again on the agenda in the wake of the destruction of Hungarian chip manufacture. The electronics industry of the world offers many developmental possibilities. The GDR, for example, has realized one of the most extreme versions of a fundamentally self-sufficient development policy operating with very large investments, one which has been successful in many respects from the technical point of view. In what follows Helmut Kappelhoff, director of the Stahnsdorf Microelectronics Factory, who visited Hungary on a lecture tour as a delegate of the 11th congress of the Socialist Unity Party of Germany, answers questions connected with the developmental philosophy of the GDR electronics industry and with the status of the enterprises of the branch.

[Question] What is the position of your enterprise in the microelectronics industry of the GDR?

[Answer] Our enterprise is one of the 26 enterprises of the Microelectronics Combine. The combine embraces a very broad scale of the microelectronics industry. We ourselves manufacture the silicon monocrystals needed to produce chips, the technological equipment needed to manufacture parts and a number of types of parts. In Erfurt, where the center of the combine is, they manufacture primarily integrated circuits for computers, including the 8 bit microprocessors known in Hungary. In Frankfurt an der Oder they manufacture analog circuits; Hungary has purchased technological equipment from there to manufacture such circuits. Our Berlin factory deals with manufacture of color picture tubes and opto-electronic parts.

Outside the Microelectronics Combine there are two, or more recently three, additional combines which belong to the microelectronics branch. The 14 enterprises of the Electronic Parts Combine manufacture primarily passive parts; the Ceramic Parts Combine manufactures so-called hybrid circuits. More recently the Karl Zeiss Jena combine has also joined in the manufacture of microelectronic products, and has taken over several enterprises from our combine. In the area of microelectronics this combine will manufacture

primarily precision instruments. In addition, the director general of Zeiss was the first commentator at the most recent congress of the SED, where he reported that they had developed the manufacturing technology for a 1 megabit integrated circuit and were working on development of technological equipment on which 4 megabit circuits could be manufactured.

[Question] What you have said about the GDR microelectronics industry suggests that in recent years you have made investments there greater by orders of magnitude than in Hungary where, in the last 5 years, we have spent 4-5 billion forints on development of the electronic parts industry. Could we know what this sum was in the GDR?

[Answer] Unfortunately I do not know what the complete electronic parts industry investment was for us, but I can say that it was a very large sum. In recent years housing construction and microelectronics have been the two largest scale economic programs for us. For example, money was not spent to renew the auto industry because we spent gigantic sums on the two branches mentioned. We turned several billion marks to creation of the super clean areas needed for chip manufacture alone.

[Question] What is the philosophy for the development of the microelectronics industry in the GDR? In what ratio do you make parts for your own use or for export?

[Answer] We manufacture parts primarily for our own industry, so that we can produce products which are also competitive abroad. The machine tool industry, the industry manufacturing electronic consumer goods and the computer industry, which use the parts, build exclusively from parts produced in the GDR and in socialist countries. We do not want to get into a situation where we are dependent on anyone and we would not like to be at the mercy of anyone in any respect.

[Question] How intensive is your cooperation with the socialist countries?

[Answer] The microelectronics industry of the GDR has very broad contacts with the Soviet Union, with which we are tied by a specialization agreement going up to the year 2000. We cooperate with other socialist countries also, for the GDR by itself cannot manufacture the entire range of microelectronic parts. Domestic industry uses 55 percent of the production of our combine, 45 percent is export, the bulk of which goes to the socialist countries. The ratio is similar at our enterprise, but we ship one third of our export to western markets.

[Question] To what extent does the GDR industry manufacturing electronic equipment depend on domestic parts sources and to what extent does it depend on socialist parts sources?

[Answer] About half of the parts used are domestic products, the rest come from socialist countries. We just do not use western parts for mass manufacture. As a rare exception equipment manufacturing enterprises in the GDR can get several dozen western parts for individual developments. In such cases the parts manufacturing enterprise must be able to solve domestic series

manufacture of the given part within 1-2 years so that when the developers get to mass production these can be built into the device.

[Question] Do the technologies used for parts manufacture also come exclusively from domestic or socialist sources? Even in the 1970's, for example, most socialist countries purchased from western firms the basic technology for chip manufacture.

[Answer] We produce parts exclusively with our own and socialist technologies. We ourselves developed 80 percent of the parts. For example, we do not yet have a 16 bit microprocessor, but until a domestic prototype is ready we will build two 8 bit microprocessors into the devices.

I do not say that it is easy to get on with these extraordinarily complex technologies. For example, in the case of high complexity integrated circuits--the 64 K or 256 K RAM's--we have suffered with one and even zero percent yield indexes, and even today the ratio is 8-10 percent. In the case of medium complexity integrated circuits we better approach the international level, which means a 40-50 percent yield, as opposed to our 35-45 percent. In general I can say that the technical level of the microelectronic parts being made in the GDR lags behind the world level by about 5 percent.

[Question] Listening to your answers it appears that the western embargo is causing no headaches in the GDR.

[Answer] For all that we are cooperating with the West too; for example, we purchased the already mentioned color picture tube manufacturing technology from Japan. The COCOM committee in Paris takes the embargo very seriously, so then the situation is that what we might buy they do not sell and what they would sell we do not need, or it is too expensive.

[Question] Can an electronics industry be competitive on western markets if it works exclusively with parts from socialist countries? According to the statistics the GDR has been forced back to a certain extent in the last 1-2 decades on the market for the most modern electrical industry equipment.

[Answer] I do not accept the last statement. Even today one third of the export of the GDR goes to capitalist markets, and this export grows year after year. As for your question, it is not only my opinion that such an electronics industry can exist, the example of the GDR shows that it is already a fact.

[Question] The self-sufficient nature of the GDR electronic parts industry has caused problems in cooperation with the socialist countries in the past. Hungarian enterprises have complained that the different standards make exchange or joint development difficult.

[Answer] We also develop and manufacture parts corresponding to western standards, we should recognize these parameters. To stay with my own enterprise, our parts in the area of power electronics correspond to the CEMA standard, which is equivalent to the international standards proposed by the ICE.

[Question] The cumbersomeness of the foreign trade apparatus and of plan harmonization in the socialist exchange of electronic parts causes many problems.

[Answer] This cumbersomeness is a prejudice which is mentioned too often. For example, the MIcroelectronics Combine has its own representative in our trade offices in Budapest; they will react very quickly to any request. It has also happened in the course of my present tour of Hungary that when I showed our prospectuses they were surprised--they could buy from us parts which they are now getting from the West.

[Question] So the Hungarian enterprises just have to order them and you will ship them right off?

[Answer] Naturally the harmonized plan is the basis for mutual deliveries. If you were to ask us now for parts in a small series we could not reprogram our entire production for that, in general we manufacture in series of a hundred million. In such cases the westerners also ship from the warehouse, or more precisely from the warehouses of intermediary merchants. I do not consider it unimaginable that such an arrangement could come into being among the socialist countries also.

[Question] How independent are the enterprises of the Microelectronics Combine? Can they maintain direct contacts with foreign enterprises?

[Answer] I have noticed that here in Hungary many are insufficiently aware that the enterprises of the combines in our country are completely independent legally and financially. Party and government resolutions do set the fundamental developmental directions for microelectronics, but we, the enterprises, proposed what should go into the plans. The enterprises themselves assume the credits for the several developmental programs and naturally we have to be careful that the investment should be profitable. We say what products we will manufacture and sell, and at what price. The foreign trade enterprise of the combine determines the foreign trade prices, but we decide whether or not we are inclined to export at such prices. So we must develop a product structure with which we can make a good profit. Naturally we can enter into direct contacts with foreign enterprises as well.

[Question] You certainly know about the great catastrophe which has befallen the Hungarian microelectronics industry. Has a similar accident ever happened in the GDR?

[Answer] Thank God no, but we do feel that what has happened here is a very great misfortune. The deputy minister of our Ministry of Electrotechnology and Electronics has just been visiting here and he talked about how we can rush to the aid of the MEV [Microelectronics Enterprise] with chip deliveries. We know what a big problem it is if an enterprise cannot give people work because of a shortage of parts.

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EAST EUROPE/MICROELECTRONICS

# RADIO ENGINEERING FACTORY GOALS FOR SEVENTH 5-YEAR PLAN

Budapest HIRADASTECHNIKA in Hungarian No 3, 1986 pp 97-98

[Article by Janos Goblos, REMIX: "The Developmental Goals of REMIX in the Seventh 5-Year Plan," based on a talk given at the 1985 Parts Seminar, Balatonfured]

[Excerpts] Summary

At the 1985 Parts Seminar the author gave a description of the plans of REMIX for the period 1986-1990. The enterprise would like to implement considerable product modernization and a developmental dynamic no worse than in the Sixth 5-Year Plan. Touching on the methodological background for this he provides a brief analysis of the expected results.

## 2. Where Are We Today at REMIX?

Five years ago, filled with the joy of the newly approved EKFP [Electronics Central Development Program], we prescribed a comprehensive reconstruction. We were certainly fortunate in that we were able to win the sympathy and support not only of the supervisory and national technical guidance organs but also of banking guidance, which had substantially less emotional interest. Today we have reached the point where we produce a significant part of our passive RC elements with modern technologies, and the investment in a hybrid industrial supply base is nearly completed. This latter is a year and a half behind the original plan thinking. The reason is the financing delay which derived from the national economic problems of 1982. Also for this reason the modernization and technological reconstruction of our potentiometer assortment will stretch over into the Seventh 5-Year Plan period. The following table shows the annual marketing structure of the factory according to the modernness of the products.

We have shown in the table not only where we are but also where we would like to be 5 years hence. With this I want to show that we have taken only the first step to reduce the technical backwardness, and the task will not be completed after 5 more years either. As a result of the investments (and personnel reductions) carried out thus far the gross per capita value of tools of production (fixed assets) increased from 114 forints in 1980 to 233 forints

in 1985 while the volume of parts produced per year has nearly doubled, and in 1985 will exceed a value of 1,100 million forints.

Table 1. Change in the Modernness of REMIX Products Over 10 Years. A good to medium level can be maintained until 1990 with the present investment and development possibilities.

| Product modernness | Characteristic age (in years) of product | Percent of annual turnover 1980 | 1985 | 1990 |
|---|---|---|---|---|
| Competitive on every market | Less than 5 | 27 | 34 | 40 |
| Modern | Equal to or less than 10 | 24 | 32 | 35 |
| Obsolete | More than 10 | 49 | 34 | 25 |

3. Where Next?

At the time of writing this article (end of October 1985) the enterprise and state plan ideas are receiving their final form. Within the EKFP of the Seventh 5-Year Plan, about 7 billion forints, nearly one third will go to development of passive and electromechanical elements. The enterprise sources coming up, the credit which can be assumed for this purpose and possible state fund awards involving a fee will provide the REMIX possibilities, withdrawing the credit repayment burdens of the preceding plan period. The balance of this must be over 800 million forints if we are to achieve the product composition shown in Table 1 for 1990. We are counting on R and D expenditures (technical development fund) of similar magnitude.

An outline of the chief decision elements:

--the acquired peak technologies must be kept up to level, which means a considerable "on-top" development; for example, development of the precision members of the R534 capless resistor family (narrow Tk and tolerance, better stability, coated styles, 5 mm raster layer condensers, etc.);

--we must reckon with the domestic start-up of surface mounting techniques and must produce the necessary parts background (e.g., chip resistors, chip layer condensers, chip carriers, and parallel with this we must reckon with a further dynamic spread of hybrid technologies, HLSI);

--the market for RC elements will grow at a rate of 8-12 percent per year, that for hybrid elements at a rate of 18-25 percent; we are reckoning with stagnating or mildly falling prices, with wage and material cost increments coming to 10 percent per year. It would be too early to give an opinion on certain price adjustment ideas; such a measure would produce a new situation, involving enterprise resources too. We are expecting tightening economic regulators and conditions;

--the enterprise would like to follow the external processes outlined and, within its possibilities, would like to get ahead of them in some areas (e.g., chip resistors). We want to modernize the potentiometer profile and we are planning a generation change for some of our RC elements (SMD).

All this can be seen in a reviewable form in Figure 2.

Realization of the plan will make possible in 1990 a comparison, relative to the world level at that time, no worse than today in the area of REMIX passive RC elements and hybrids.

This means that we must improve domestic supply for these parts, for we are planning manufacturing capacity expansions parallel with technical development as a result of which production in 1990 will come to 2,300 million forints with hybrids approaching 700 million forints, potentiometers accounting for 300-400 million forints and trade in the other REMIX RC elements coming to 1,200 million forints.

Biographic Note

Janos Goblos is a graduate electrical engineer, he has worked at REMIX since 1954, until 1957 as a plant engineer or condenser plant chief. Between 1958 and 1968 he dealt with development of condensers. From 1969 to 1980 he was chief developmental engineer and since 1980 has been the technical deputy director of REMIX. He has been a member of the HTE [Communications Engineering Scientific Association] for more than 25 years, he is a member of the executive committee and a member of the leadership of the Parts Special Department.

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# PERFORMANCE MODEL OF MULTIPROCESSOR SYSTEMS

Budapest HIRADASTECHNIKA in Hungarian No 3, 1986 pp 99-102

[Article by Dr Peter Risztics, Process Control Faculty, Budapest Technical University: "A Performance Capacity Model of Multiprocessor Systems"]

[Excerpts] Summary

In the case of control and monitoring systems it is extraordinarily important to the user with what probability a microprocessor system executes the prescribed tasks. This task performance probability can be characterized by the reliability and performance capacity of the system. The article deals with performance capacity modelling in degradable systems.

Biographic Note

Dr Peter Risztics obtained his electrical engineering diploma in 1969 at the Budapest Technical University and has been working in the Process Control Faculty since then. He participates in the instructional and research work of the faculty and is theme chief for several research and development projects. His chief research area is designing multiprocessor systems, their use as control and engineering design systems and a study of the reliability and performance capacity of such systems. Dr Peter Risztics is co-author of several books and his numerous articles have appeared in domestic and foreign professional journals.

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# IMPORTANCE OF FAILURE CRITERION IN COMPONENT RELIABILITY

Budapest HIRADASTECHNIKA in Hungarian No 3, 1986 pp 103-108

[Article by Peter Kesselyak, Developmental Institute of the BHG Communications Engineering Enterprise: "The Significance of the Failure Criterion in Judging Component Reliability"]

[Excerpts] Summary: The milder the failure criterion for some component in a given application the higher the reliability which will be shown by the component--without there being any change in its physical properties, environment or load conditions. This fact might serve as a sort of relativity principle for reliability estimates. The deliberate use of this principle introduces a new dimension--or degree of freedom--into reliability estimates and may disclose redundancies--previously not recognized--which system designers may have built into their products already or which it may be expedient to build in.

The report describes an example of how great a reliability increase can be achieved by virtue of an appropriate selection of applications dependent failure criteria for components, if the selection is in harmony with the general operational requirements of the product or can be brought into harmony with them by an appropriate systems design procedure.

Biographic Note: Peter Kesselyak obtained his degree in 1958 in the mathematics-physics section of the Szeged Science University. Since 1959 he has been a developmental engineer for the BHG Communications Engineering Enterprise. Within the framework of inter-state technical-scientific cooperation he worked for years as a consultant in South China, and then in Cuba, doing tropicalization and reliability studies on communications engineering products. He is the author of numerous professional articles and conference papers on this theme. He is a member of the domestic work group of the 56th Reliability Special Committee of the European Quality Affairs Organization and IEC. His chief area of interest is system reliability, including hardware and software components. He won the 1983 prize of the European Quality Affairs Organization for introduction of failure capacity as a new systems reliability characteristic.

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EAST EUROPE/MICROELECTRONICS

# LOGIC LEVEL SIMULATOR PROGRAM MICROSIM FOR MICROCOMPUTER

Budapest HIRADASTECHNIKA in Hungarian No 3, 1986 pp 109-112

[Article by Dr Peter Gartner, Electronic Devices Faculty of the Budapest Technical University: "MicroSIM--A Logic Simulator for a Microcomputer"]

[Excerpts] Summary

The paper describes the MicroSIM logic simulator program prepared for a Z80 based microcomputer. The program does a simulation of networks extending to several hundred gate functions, at the gate level with the unit gate delay method. It has a powerful high level language to describe input sequences and is also capable of simple fault simulation. Its use facilitates the logical design of and test design for equipment oriented circuits.

Biographic Note

Dr Peter Gartner graduated from the communications engineering section of the Electrical Engineering School of the Budapest Technical University in 1960 and earned his honors degree in 1961. He worked as a developmental engineer at the Electromechanical Enterprise until 1963, doing research and development and realization projects for television transmitter antenna systems. He has worked in the Electronic Devices Faculty of the Budapest Technical University since 1963. In 1968 he earned the title of university doctor in the area of antennas and feed lines. At present he deals with measurement techniques for electronic devices, especially with testing problems for highly complex integrated circuits.

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EAST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

# DEVELOPMENTS IN CSSR NUCLEAR RESEARCH, POWER PLANTS

## Program of Radioisotope Institute

Prague TECHNICKY TYDENIK in Czech No 27, 1 Jul 86 p 7

[Article by Eng Bedrich Fridrich, director of the UVVVR (Institute for Research, Production, and Utilization of Radioisotopes) Prague: "The Nuclear Program Is Not Just for Energy Production"]

[Text] History and Current Status

We connect the establishment of the Institute for Research, Production, and Utilization of Radioisotopes Prague in 1919 with the discovery of radium, with radium production, with the existence of the raw materials base of Jachymov pitchblende, and with the development of Czechoslovak radiology. The typical feature of the institute's work from its founding to the present is linking theory with practice and contacts with other sectors of the national economy. Theoretical and experimental solutions to research problems have always been found here. The institute has at the same time functioned as a testing center for measuring the radioactivity of radium preparations and been responsible for ionizing radiation in accordance with the needs of the Directorate of Jachymov Mines. It also served as an information center for radiological methods in medicine and industrial fields. In the 1950s, mainly after an intergovernmental agreement was signed with the USSR, the institute's research, production, and service activities were based on supplying artificial radionuclides which were produced in the first reactors and cyclotrons.

Currently the institute is directed by the economic organization of Czechoslovak research and development, which are subordinate to the Czechoslovak Commission for Atomic Energy. Since 1981 a new organization, the research production unit, has been set up in our institute. Its mission is the research, development, and production of radioactive preparations, primarily tracing compounds, diagnostic sets in vitro, sealed radiation sources, and reference sources. It also works on applications of radionuclides and ionizing radiation and distribution and technical service of isotropic products.

## The Institute's Research Program

In the field of tracing compounds further research is planned in the near future on methods of preparing new, biologically significant tracing compounds of radioactive carbon and tritium from components of nucleic acids, saccharides, peptides, amino acids, steriods, and antibiotics. To meet the needs of basic research, genetic engineering, molecular biology, and medicine, research will be directed at the preparation of tracing compounds with greater molecular weight showing sufficient biological activity. Other areas will also be developed in response to developments in global science and technology, developments in high-quality Czechoslovak chemistry, biology and biotechnological programs, and problems of ecology and the protection of the populace's health.

The introduction of radiosaturation analysis has created a new sector of diagnostics in medicine and veterinary medicine. These methods have great sensitivity and selectivity in biological materials and are widely applied not only in medical and biological research, but also in practical clinical diagnostics. Determining changes in the concentration of the most varied hormones, catecholamines, or enzymes has accelerated and made the diagnosis of many illnesses more precise. Currently nine types of diagnostics sets are being supplied to domestic and foreign workplaces.

In the future we will direct our efforts towards developing sets required for the diagnosis of, for example, cardiac and vascular illnesses, which are among the most common and which mostly lead to longterm incapacitation. These diagnostic sets will, be supplied to our workplaces and exported abroad (after research work is completed). We expect that our institute will participate in the task Diseases of Civilization, which will be performed in the CSSR by medical institutions under the aegis of the International Medical Organization. Our future objectives also include assessing the suitability of application of the so-called immunoradiometric method and studying other methods of detection for clinical examination without the use of radionuclides. We would like to put into production roughly three new sets annually, primarily in the cardiovascular and diametologic program.

## Radiation Equipment

In previous years several technological procedures for preparation of various types of sealed radiation sources were developed at the institute. In the future there production will begin on area alfa radiation sources with americium for fire detectors and the elimination of electrostatic charges, isotropic neutron sources and low-energy gamma radiation sources, and a newly developed medicinal radiation source with cesium. Production of precision measured radiation sources, the so-called standards for radionuclides, will be expanded in the near future in accordance with the development of nuclear energy in Czechoslovakia and, in some cases, for environmental protection purposes. In the development of measuring standards for ionizing radiation, we are assisted by a decision of the Office for Standardization and Measurements which made the standardization equipment developed in the institute over a long period the state standard for quantity of activity starting on 16 January 1985.

In general, it can be said that the institute's research program is developed according to the state and departmental plan for the development of science and technology. According to its material or nonmaterial outputs, it can be divided into a section in which the results of the tasks are primarily implemented in our own production and another section which is implemented in other branches of the national economy. We have already discussed the first section. In the second group, we include mainly the radionuclide methods, including the use of radioindicators and radiation equipment. The importance of the institute's production operations can be seen from the organization of the research production unit. At the same time one can expect that over half of our production will be designated for export in the future. The institute's most important technical services include central distribution of radioactive materials, nationwide collection of low-level radioactive waste, and nationwide service of personal dosimeters for areas where ionizing equipment is used. Currently about 17,000 monitored employees are being followed and more are expected.

Future Perspectives and Outlooks

It is important that the institute's activities are closely connected with all five priority groupings of tasks laid out by the Overall Program of R&D Progress of CEMA Member States up to the year 2000 both for the needs of the Czechoslovak national economy and for CEMA countries concerning cooperation in the peaceful uses of atomic energy. In the field of electronics applications, we are oriented toward radioanalytic and irradiation methods for semiconductor technology and optical electronics. Overall automation will require development and production of radioactive radiation sources needed for sensors for the automation of the widest variety of technological processes. In nuclear power production, there will be the effect of large doses of radiation on control elements and other materials used in nuclear reactors and the support of the meteorological services in the overall protection of health and safety of work and environmental protection in the operation of nuclear equipment. Our task in developing new types of materials will be to modify plastic materials, glass, wood, and textiles through radiation. We will support the development of biotechnology with further research in the preparation of new, biologically significant tracing compounds.

The Institute for Research, Production, and Utilization of Radioisotopes has always carried out its tasks. It is therefore the duty of all employees to do the maximum at this time as well so that in the future it will continue as an important, prospering component of the Czechoslovak R&D base in the nonenergy field of the Czechoslovak nuclear program.

## Progress of Temelin Plant

Prague TECHNICKY TYDENIK in Czech No 30, 22 Jul 86 p 7

[Article by Eng Josef Tichy: "Temelin: A Year of Rapid Growth"]

[Text] One gloomy afternoon I took a walk through the new bus station at the construction site near the village of Temelin in the South Bohemian Kraj (about 5 km from Tyn nad Vltavou) and waited for the connection to Ceske Budejovice.

The outlines of several building showed in the fields where there had been none 2 years ago: administrative offices, plant dining halls and kitchens, workshops, warehouses, etc. Some distance away, dozens of personal cars were in the parking lot and every once in a while someone drove off or arrived. The license plates showed that they were from the neighboring okreses. Over an extensive area one could hear the engines of heavy construction equipment and in places groups of workmen could be seen. The entire picture and all the sounds made it quite clear that the construction of the temelin nuclear power plant, at which preparatory work commenced in May 1983, was picking up speed. From this perspective, I went over the data given us beforehand by the most qualified people, the director of the newly formed enterprise Temelin Nuclear Power Plant Construction, Eng Jaroslav Jarolimek; the technical director of VHJ (economic production unit) Hydrologic Construction Prague, Eng Josef Novak; and the deputy investor of Czech Energy Plants, Eng Zdenek Casta.

The Infrastructure Has Priority

"When we first started to come here," said Eng Jarolimek, "deer grazed nearby. Since then, construction in Temelin has proceeded at an increasing rate of speed. This is the first construction project of this type where the infrastructure has been built in advance; we have put in waterlines, sewage, connections to the engineering network, changing rooms, heat, dining facilities, and housing for the personnel. Moreover, these facilities will stay here."

In what areas had the construction project made progress in 1985?

"The establishment of the national enterprise for the construction of the Temelin nuclear power plant, which actually took effect on 7 January 1985, has been accelerated. Its basis was the plant split off from Hydrological Construction located in Sezimova Usti. However, the entire infrastructure of the new enterprise is not yet fully complete and its size will gradually be apparent," continued Eng Jarolimek.

How can one characterize the year 1986 in the construction project?

"It is a year of rapid growth. The work amounts to kcs 600 million, which is almost twice that of the previous year, but there has been growth not only in the financial volume, but also in physical units. The number of workers has grown from 2,000 at the end of 1985 to 2,800 or 2,900 at the end of 1986. The enterprise is also responsible for construction of the Hnevkovice water works, which will supply the nuclear power plant with water."

We are at the receiving base, the second construction project (temporary housing, changing rooms, a kitchen with a capacity of 1,000 meals per shift, area transportation, machine and automotive repair shops, the sewage network, and mechanical systems). Construction will be completed this year. All this has allowed work on the construction site of the nuclear power plant itself to be developed.

The third construction project (out of a total of six), the production and social infrastructure, contains the main cement plant, storage management, a

metal-working plant, communications system, a three-track rail station, a railroad for construction, storage areas, social facilities, three administrative buildings, other kitchens with dining halls, two medical centers, and a shopping center. Some of these facilities were completed in 1985 (for example, the large cement plant, one of the larger warehouses, the carpentry shop, and the electronics shop). Others will be ready by the middle of 1987. As far as the social base is concerned, the first two large-capacity changing rooms will be ready in July of next year, the same as the first large plant kitchen. This year we will continue intensively with the construction of the railroad spur so that the railroad station can begin service in 1987. The target date for completing the third construction project is 1988.

What is the Fourth Construction Project?

The next (and largest) will be the fourth construction project at the electric power plant itself. This is a matter of groundwork and an engineering network. Before the electric power plant begins operation, the employees of the new construction enterprise want to create conditions where they will not have to get around holes and trenches in putting the first section into operation, as was the case in similar building sites so far, and not just in Czechoslovakia. Among other things, the technological equipment of the construction site fits in here. Intensive construction will begin at the start of next year.

Bulldozer equipment will be used in the construction, primarily two caterpillar bulldozers (8 million $m^3$ in 1986) and excavators (3 million $m^3$). The volume of loads moved by truck this year will increase from last year's 3.5 million tons to 9 million tons. Consumption of concrete will grow from 70,000 $m^3$ to 200,000 $m^3$. A cement plant with a capacity of 90 $m^3$ per hour was assembled in three weeks. The area of concrete forms this year will rise from last year's 160,000 $m^2$ to 200,000 $m^2$.

Rebuilding the highway from Ceske Budejovice to Tyn is continuing intensively. Already 14 bus lines are in operation and arrangements are underway for the construction of trolley lines. Reconstruction of the railroad track from Ceske Budejove to Tyn nad Vltavou is necessary. The enormous amount of material which will be transported here must at the same time be handled by dispatchers so that they provide for organized storage. This would hardly be possible using traditional methods.

The Arrival of the Computers

A welcome tool for handling the complicated management of an extensive construction site (there will be 13,000 workers around 1990) will be the computer center after it is installed this year. Until now wages, budgets, etc. have been processed. But the computer also contains materials dispatching, as well as the entire system of changing rooms and housing for all those working on the construction project, the entire social infrastructure, etc. Not even storage management and dispatching for the construction are left out. The center is supposed to be in operation by the end of next year. The central computer center located in Tabor will be equipped with Soviet computers of the standard system. An interactive computer for control of the technological processes will connect into the data bank in Tabor. The cement plant will have a small terminal computer. The investor will also have his own computer, which will be a an ADT 4000.

And What About Problems?

It might appear that everything at the construction project is running smoothly. In actuality, however, the supervisors' heads are full of worries, as is always the case with such an enormous job. There are difficulties, for example, with delays in design caused not only by shortages of designers, but also by changes in the designs, even though they are made for very serious reasons. Other problems are caused by some subcontractors who act as if they do not want to understand that an exceptional construction project like Temelin also requires exceptional procedures and that it is not possible to proceed with routine administrative methods. It is also not easy to cope with the enormous influx of people, to process them, and to teach certain habits.

The Temelin nuclear power plant is the first one here with 1,000 MW sections. It is also set up for heat extraction which will go through heat distributors to, for example, Ceske Budejovice and Tabor. The construction project general contractor is Hydrologic Construction Prague and the general contractor for technology is Electrical Power Construction Skoda Prague. Preparation of these construction projects is taking place through Czechoslovak-Soviet cooperation. Even though it is still a relatively long time from today, in 60 months after concrete is poured for the base slabs, experimental operation of the first section is supposed to begin in November 1992.

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